Comisia de Fizica Aplicata

Membri:

Dr. Eniko Gyorgy (Inst. Sciencia Mat, Barcelona)

Dr. Ioana Pintilie (INFM-Magurele)

Prof. Viorica Simon (UBB-Cluj)

Dr. Horia Chiriac (IFT- Iasi)

Prof. Mihai Popescu (INFM-Magurele)

Dr. Razvan Stoian (Université Jean MONNET, Laboratoire Hubert Curien , St. Etienne)

Prof. Ion N. Mihailescu - INFLPR

Introducere

Fizica aplicata este definita prin totalitatea fenomenelor fizice utilizate in sisteme si dispozitive pe baza unor materiale adecvate care sa sustina implementarea in practica a acestora. Fizica aplicata este un domeniu larg si fecund al fizicii contemporane. Ea se dezvoltă mână în mână cu fizica materialelor al cărei vlăstar viguros este fizica nanomaterialelor.

O clasificare a fizicii aplicate in subdomenii este foarte greu de facut avand in vedere interpătrunderea fenomenologiilor şi varietatea extrem de bogata a materiei sub multiplele ei forme de existentă

Trebuie să avem în vedere faptul că fizica aplicată se referă la toate activităţile direcţionate către multiple tehnologii. Spre deosebire de inginerie în general, fizica aplicată este ancorată în cunoştinţele fundamentale de fizică, pe care le utilizează pentru rezolvarea unor probleme practice, tehnologice. Din acest motiv, fizica aplicată include practic toate domeniile din fizică cu excepţia celor pur teoretice, dar şi cercetările teoretice din fizică au de foarte multe ori în vedere rezolvarea unor probleme tehnologice, deci pot fi cercetări de fizică aplicată.

Domeniile fizicii aplicate sunt foarte vaste şi numeroase – Fizica Materiei Condensate, Fizica Laserilor, Fizica Semiconductorilor, Control Nedistructiv, Acustică, Electromagnetism, Fizica Materialelor, Fizica Vidului, Astrofizică, etc. Fizica aplicată nu este numai un domeniu transversal, care acoperă şi reuneşte toate celelalte domenii din fizică, dar se interpătrunde cu multe alte discipline, cum ar fi de exemplu Ingineria Electrică, Ştiinţa Materialelor, Chimia şi Biologia.

Pe baza datelor din raportul de la etapa a II-a a proiectului ESFRO se pot selecta direcţiile mari de fizică aplicată, care presupun existenţa unor resurse pe măsură (umane şi infrastructură) şi care au demonstrat şi existenţa unui potenţial mare de a obţine rezultate importante la nivel internaţional. Astfel, cele mai importante date le găsim în capitolele III şi IV ale raportului menţionat. Avem cele opt direcţii mari cu cele mai bune rezultate prezentate în capitolul III (nu mai menţionăm Fizica Aplicată, dat fiind faptul că le include pe toate

celelalte), dintre care evidentiem Optica, Fizica Materiei Condensate, Fizica Nucleară, Fizica Particulelor, Fizica Atomică şi Moleculară, Fizica Plasmei. Exista şi o direcție mare de interpătrundere cu alte discipline (Inginerie Electrică, Ştiința Materialelor, Chimie, Biologie, Medicină, etc.) care poate să acopere şi alte domenii mai mici din fizică (în sensul de „cu rezultate anterioare mai puține"), respectiv Fizica Multidisciplinară.

Aceste şapte direcții mari de fizică aplicată au un potențial ridicat de cooperare internă şi internațională, după cum este arătat în raport, şi totodată beneficiază încă de o resursă umană competentă, care le asigură masa critică necesară continuării şi dezvoltării activității specifice. În ceea ce priveşte infrastructura, aceasta a fost dezvoltată semnificativ în ultimii ani şi se afla in continuare in plin proces de dezvoltare.

Putem să intrăm mai adânc în detalii folosidu-ne de una dintre cele mai utilizate clasificari a fizicii şi anume Physics and Astronomy Classification Scheme (PACS). Conform PACS, întreaga Fizică este împărțită în zece domenii sau direcții mari (detaliile se regăsesc la adresa de internet http://www.aip.org/pacs/pacs2010/individuals/pacs2010_regular_edition/index.html). În PACS există un grad de detaliere mai mare, astfel în fiecare subiect se regăsesc probleme mai detaliate şi mai concrete. Putem aşadar să ne folosim de clasificarea PACS pentru a detalia temele şi subiectele, si a evita formularea unor teme şi subiecte care nu se regăsesc în clasificări internaționale.

In ceea ce priveste technologiile si aplicatiile laser intr-un domeniu moderat de energii si pulsuri relative scurte, propunerile se bazeaza pe:

a) -existenta unei competente solide in arii conexe: optica, materiale, corp solid, chimie fizica, biofizica, laser, interactie laser-materie;

b) -existenta unei infrastructuri laser in modul pulsat si in domenii de fs-ps-ns-μs;

c) -existenta unei baze semnificative de rezultate de cercetare in domeniul interactiunii laser-materie;

d) -un efort sustinut pe plan international de dezvoltare si implementare a technologiilor laser de inalta precizie.

Propunerile au componente atit in aplicatii care tind sa devina astazi (sau intr-un orizont de 5 ani) tehnologii cat si in procese standard. Ele pot fi utilizate in mod singular (tehnici intr-un stadiu de emergenta ce pot constitui o baza pentru procese mai complexe –add-on) sau in relatie cu alte tehnologii. O componenta semnificativa de cercetare fundamentala exista in toate subdomeniile propuse.

Teme si subiecte:

Tema 1: Straturi subtiri, suprafete, interfete, materiale structurate si nanostructuri

Subiectul 1.1: Tehnologii de depunere, crestere, procesare metale, oxizi, semiconductori, nanostructuri

Subiectul 1.2: Nucleere straturi subtiri; homo si hetero-epitaxie; structura si forte de legatura, interfete solid-solid, solid-lichid

Subiectul 1.3: Tehnici de Caracterizare si Computationale

Subiectul 1.4: Tehnologii de crestere, inginerie de defecte

Subiectul 1.5: Straturi şi multistraturi pentru senzori de gaze si lichide

Context: Realizari recente si perspective (la nivel international):

Tehnologiile de depunere, crestere si procesare au progresat foarte mult in ultimele decenii, datorita in primul rand progreselor tehnologice in domeniul surselor de incalzire, al dispozitivelor de producere a vidului, al surselor de radiatii utilizate in depunere si procesare (lasere, tunuri de electroni, fascicole ionice). Homo si heteroepitaxia straturilor subtiri, studiul suprafetelor si interfetelor reprezinta prioritati pe plan international atat la nivel experimental (tehnici de depunere si caracterizare) cat si predictional (modelare teoretica). Totodata, directii noi de cercetare sunt legate de producerea nano-obiectelor prin diverse metode fizico-chimice, mecanice sau litografice, precum si de dezvoltarea aparaturii specifice pentru caracterizarea si metrologizarea nanomaterialelor si nanostructurilor.

Context: Realizari recente si perspective (la nivel national):

Progresele cele mai importante inregistrate la nivel national au fost in materie de depunere si procesare straturi subtiri policristaline si nano-obiecte. Achizitiile recente de echipamente de ultima generatie in materie de depunere, procesare si caracterizare straturi subtiri, suprafete si interfete deschid perspective noi pentru cercetarea romaneasca in domeniu, facand posibila abordarea subiectelor noi de cercetare la nivel mondial.

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
liquid-solid	2510	32	14	0.56	3	9.38
solid surfaces	6464	38	51	0.79	6	15.79
solid-solid	650	16	7	1.08	1	6.25
interface structure	7235	36	48	0.66	3	8.33
thin film structure	8343	35	82	0.98	5	14.29
nucleation and growth	9321	40	33	0.35	4	10.00
defects and impurities	930	22	11	1.18	3	13.64

metal-insulator-semiconductor	456	11	0	0	0	0
metal-insulator-metal	540	16	0	0	0	0
metal-semiconductor-metal	277	10	4	1.44	2	20.00
II-VI semiconductors	1335	20	2	0.15	1	5.00
nanoscale structures	2265	39	11	0.49	2	5.13
film growth	9826	35	55	0.56	4	11.43
film sputtering	5290	22	39	0.74	4	18.18
epitaxy	9553	34	16	0.17	3	8.82
mesoscopic systems	873	22	8	0.92	2	9.09
nanoscale systems	2007	43	14	0.70	2	4.65

Pentru cuvintele cheie cu cea mai mare contribuție Hirsch, „metal-semiconductor-metal” şi „film sputtering”, avem următoarele referințe selectate automat de pe WoS din perioada aleasă (2008-2011):

1. D. Biro, P. B. Barna, L. Szekely, O. Geszti, T. Hattori and A. Devenyi, Nuclear Instruments & Methods in Physics Research Section a-Accelerators Spectrometers Detectors and Associated Equipment **590** (1-3), 99-106 (2008).
2. M. Braic, V. Braic, M. Balaceanu, C. N. Zoita, A. Vladescu and E. Grigore, Surface & Coatings Technology **204** (12-13), 2010-2014 (2010).
3. E. Budianu, R. Muller, M. Purica, L. Eftime, R. Skarvelakis and G. Kiriakidis, Thin Solid Films **518** (4), 1057-1059 (2009).
4. E. Budianu, M. Purica, F. Iacomi, C. Baban, P. Prepelita and E. Manea, Thin Solid Films **516** (7), 1629-1633 (2008).
5. M. Cernea, L. Trupina, C. Plapcianu, R. Trusca and C. Galassi, Optoelectronics and Advanced Materials-Rapid Communications **3** (9), 947-950 (2009).
6. J. M. Chappe, A. C. Fernandes, L. Cunha, C. Moura, F. Vaz, N. Martin, D. Munteanu and B. Borcea, Journal of Optoelectronics and Advanced Materials **10** (4), 900-903 (2008).
7. L. Cunha, C. Moura, F. Vaz, J. M. Chappe, C. Olteanu, D. Munteanu and A. Munteanu, Journal of Optoelectronics and Advanced Materials **11** (7), 976-980 (2009).
8. N. Ekem, S. Korkmaz, S. Pat, M. Z. Balbag, N. E. Cetin, M. Ozmumcu, R. Vladoiu and G. Musa, Journal of Optoelectronics and Advanced Materials **10** (12), 3279-3282 (2008).
9. M. Flori, B. Gruzza, L. Bideux, G. Monier and C. Robert-Goumet, Applied Surface Science **254** (15), 4738-4743 (2008).
10. R. Gavrila, A. Dinescu and D. Mardare, Romanian Journal of Information Science and Technology **10** (3), 291-300 (2007).
11. F. I. Ilie and C. M. Tita, Proceedings of the Romanian Academy Series a-Mathematics

Physics Technical Sciences Information Science **8** (3), 207-211 (2007).
12. T. V. Kononenko, I. A. Nagovitsyn, G. K. Chudinova and I. N. Mihailescu, Applied Surface Science **256** (9), 2803-2808 (2010).
13. G. Lazar, B. Bouchet-Fabre, K. Zellama, M. Clin, D. Ballutaud and C. Godet, Journal of Applied Physics **104** (7) (2008).
14. L. Leontie, M. Caraman, I. Evtodiev, E. Cuculescu and A. Mija, Physica Status Solidi a-Applications and Materials Science **205** (8), 2052-2056 (2008).
15. E. Manea, L. Staicu, A. Popescu, A. C. Obreja, A. Dinescu, V. Schiopu, M. Purica and Ieee, in *Cas: 2009 International Semiconductor Conference, Vols 1 and 2, Proceedings* (2009), pp. 163-166.
16. D. Marconi, I. Matei, S. Manolache, C. Lung and A. V. Pop, Journal of Optoelectronics and Advanced Materials **10** (4), 926-928 (2008).
17. D. Mardare, A. Manole, A. Yildiz and D. Luca, Chemical Engineering Communications **198** (4), 530-540 (2011).
18. I. Matei, H. Raffy and A. V. Pop, Thin Solid Films **519** (2), 591-594 (2010).
19. A. Muller, G. Konstantinidis, M. Dragoman, D. Neculoiu, A. Dinescu, M. Androulidaki, M. Kayambaki, A. Stavrinidis, D. Vasilache, C. Buiculescu, I. Petrini, A. Kostopous and D. Dascalu, Microelectronics Journal **40** (2), 319-321 (2009).
20. A. Muller, G. Konstantinidis, M. Dragoman, D. Neculoiu, A. Kostopoulos, M. Androulidaki, M. Kayambaki and D. Vasilache, Applied Optics **47** (10), 1453-1456 (2008).
21. J. Neamtu, M. Volmer and R. V. Medianu, *Magnetotransport Properties and Tunnel Effect of Thin Film Nano-Structures*. (2008).
22. C. C. Negrila, C. Cotirlan, F. Ungureanu, C. Logofatu and R. Lazarescu, Journal of Optoelectronics and Advanced Materials **10** (6), 1379-1383 (2008).
23. M. Nicolescu, M. Anastasescu, S. Preda, J. M. Calderon-Moreno, P. Osiceanu, M. Gartner, V. S. Teodorescu, A. V. Maraloiu, V. Kampylafka, E. Aperathitis and M. Modreanu, Journal of Optoelectronics and Advanced Materials **12** (5), 1045-1051 (2010).
24. C. Olteanu, A. Munteanu, D. Munteanu, B. Borcea, F. Vaz and L. Cunha, Metalurgia International **14**, 129-132 (2009).
25. C. Olteanu, D. Munteanu, C. Ionescu, A. Munteanu, J. M. Chappe, L. Cunha and F. Vaz, International Journal of Materials & Product Technology **39** (1-2), 186-194 (2010).
26. A. V. Pop, in *Proceedings of the Physics Conference Tim-08*, edited by M. Bunoiu and I. Malaescu (2009), Vol. 1131, pp. 106-111.
27. A. V. Pop, C. Lung, D. Radulescu and V. Pop, Journal of Optoelectronics and Advanced Materials **10** (7), 1869-1871 (2008).
28. A. V. Pop, S. Manolache, R. Coldea and M. Pop, Journal of Optoelectronics and Advanced Materials **10** (4), 919-921 (2008).
29. P. Prepelita, R. Medianu, F. Garoi, A. Moldovan and A. M. Vlaicu, in *Romopto 2009: Ninth Conference on Optics: Micro- to Nanophotonics Ii*, edited by V. I. Vlad (2010), Vol. 7469.
30. P. Prepelita, R. Medianu, B. Sbarcea, F. Garoi and M. Filipescu, Applied Surface Science **256** (6), 1807-1811 (2010).
31. M. D. Stamate, I. Lazar and G. Lazar, Journal of Non-Crystalline Solids **354** (1), 61-64 (2008).
32. M. Stamate, G. Lazar and I. Lazar, Journal of Materials Science-Materials in Electronics **20** (2), 117-122 (2009).
33. G. E. Stan, C. O. Morosanu, D. A. Marcov, I. Pasuk, F. Miculescu and G. Reumont,

Applied Surface Science **255** (22), 9132-9138 (2009).
34. G. E. Stan, I. Pasuk, A. C. Galca and A. Dinescu, Digest Journal of Nanomaterials and Biostructures **5** (4), 1041-1054 (2010).
35. I. Stavarache, A. M. Lepadatu, N. G. Gheorghe, R. M. Costescu, G. E. Stan, D. Marcov, A. Slav, G. Iordache, T. F. Stoica, V. Iancu, V. S. Teodorescu, C. M. Teodorescu and M. L. Ciurea, Journal of Nanoparticle Research **13** (1), 221-232 (2011).
36. M. Suchea, S. Christoulakis, I. V. Tudose, D. Vernardou, M. I. Lygeraki, S. H. Anastasiadis, T. Kitsopoulos and G. Kiriakidis, Materials Science and Engineering B-Solid State Materials for Advanced Technology **144** (1-3), 54-59 (2007).
37. G. Telipan, L. Paslaru-Danescu and C. Racles, Metalurgia International, 22-28 (2008).
38. M. Ulmeanu, M. Filipescu and R. V. Medianu, in *Physica Status Solidi C - Current Topics in Solid State Physics, Vol 5, No 12 2008*, edited by M. Stutzmann (2008), Vol. 5, pp. 3584-3587.
39. R. Vladoiu, V. Ciupina, A. Mandes, V. Dinca, M. Contulov, G. Prodan and G. Musa, Journal of Optoelectronics and Advanced Materials **10** (3), 723-726 (2008).
40. O. Volobujeva, M. Altosaar, J. Raudoja, E. Mellikov, M. Grossberg, L. Kaupmees and P. Barvinschi, Solar Energy Materials and Solar Cells **93** (1), 11-14 (2009).
41. A. Yildiz, S. B. Lisesivdin, M. Kasap and D. Mardare, Optoelectronics and Advanced Materials-Rapid Communications **1** (10), 531-533 (2007).
42. A. Yildiz, S. B. Lisesivdin, M. Kasap and D. Mardare, Physica B-Condensed Matter **404** (8-11), 1423-1426 (2009).
43. A. Yildiz, N. Serin, M. Kasap, T. Serin and D. Mardare, Journal of Alloys and Compounds **493** (1-2), 227-232 (2010).

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
liquid-solid	2510	32	14	0.56	3	9.38
solid surfaces	6464	38	51	0.79	6	15.79
solid-solid	650	16	7	1.08	1	6.25
interface structure	7235	36	48	0.66	3	8.33
thin film structure	8343	35	82	0.98	5	14.29
nucleation and growth	9321	40	33	0.35	4	10.00
defects and impurities	930	22	11	1.18	3	13.64
metal-insulator-semiconductor	456	11	0	0	0	0
metal-insulator-metal	540	16	0	0	0	0
metal-semiconductor-metal	277	10	4	1.44	2	20.00

II-VI semiconductors	1335	20	2	0.15	1	5.00
nanoscale structures	2265	39	11	0.49	2	5.13
film growth	9826	35	55	0.56	4	11.43
film sputtering	5290	22	39	0.74	4	18.18
epitaxy	9553	34	16	0.17	3	8.82
mesoscopic systems	873	22	8	0.92	2	9.09
nanoscale systems	2007	43	14	0.70	2	4.65

Referinte in domeniul filmelor subtiri:

1. L. Andronic and A. Duta, Materials Chemistry and Physics **112** (3), 1078-1082 (2008).
2. L. Andronic, S. Manolache and A. Duta, Journal of Nanoscience and Nanotechnology **8** (2), 728-732 (2008).
3. M. Baibarac, I. Baltog and S. Lefrant, Carbon **47** (5), 1389-1398 (2009).
4. M. Baibarac, I. Baltog, S. Lefrant, J. Y. Mevellec and C. Bucur, Diamond and Related Materials **17** (7-10), 1380-1388 (2008).
5. C. Berbecaru, H. V. Alexandru, A. Ianculescu, A. Popescu, G. Socol, F. Sima and I. Mihailescu, Applied Surface Science **255** (10), 5476-5479 (2009).
6. B. Bouchet-Fabre, G. Lazar, D. Ballutaud, C. Godet and K. Zellama, Diamond and Related Materials **17** (4-5), 700-704 (2008).
7. M. Bruma and M. D. Damaceanu, Collection of Czechoslovak Chemical Communications **73** (12), 1631-1644 (2008).
8. V. Canpean and S. Astilean, Nuclear Instruments & Methods in Physics Research Section B-Beam Interactions with Materials and Atoms **267** (2), 397-399 (2009).
9. C. Capuccini, P. Torricelli, F. Sima, E. Boanini, C. Ristoscu, B. Bracci, G. Socol, M. Fini, I. N. Mihailescu and A. Bigi, Acta Biomaterialia **4** (6), 1885-1893 (2008).
10. L. Ciontea, G. Celentano, A. Augieri, T. Ristoiu, R. Suciu, M. S. Gabor, A. Rufoloni, A. Vannozzi, V. Galluzzi and T. Petrisor, in *8th European Conference on Applied Superconductivity*, edited by S. Hoste and M. Ausloos (2008), Vol. 97.
11. D. Crisan, N. Dragan, M. Crisan, M. Raieanu, A. Braileanu, M. Anastasescu, A. Lanculescu, D. Mardare, D. Luca, V. Marinescu and A. Moldovan, Journal of Physics and Chemistry of Solids **69** (10), 2548-2554 (2008).
12. M. Crisan, A. Braileanu, D. Crisan, M. Raileanu, N. Dragan, D. Mardare, V. Teodorescu, A. Ianculescu, R. Birjega and M. Dumitru, Journal of Thermal Analysis and Calorimetry **92** (1), 7-13 (2008).
13. M. Crisan, A. Braileanu, M. Raileanu, M. Zaharescu, D. Crisan, N. Dragan, M. Anastasescu, A. Ianculescu, I. Nitoi, V. E. Marinescu and S. M. Hodorogea, Journal of Non-Crystalline Solids **354** (2-9), 705-711 (2008).
14. M. Filipescu, P. M. Ossi, N. Santo and M. Dinescu, Applied Surface Science **255** (24), 9699-9702 (2009).
15. M. Gartner, P. Osiceanu, M. Anastasescu, T. Stoica, T. F. Stoica, C. Trapalis, T. Glannakopoulou, N. Todorova and A. Lagoyannis, Thin Solid Films **516** (22), 8184-8189 (2008).

16. M. Girtan, G. G. Rusu, S. Dabos-Seignon and M. Rusu, Applied Surface Science **254** (13), 4179-4185 (2008).
17. C. Hamciuc, E. Hamciuc, A. M. Ipate and L. Okrasa, Polymer **49** (3), 681-690 (2008).
18. E. Hamciuc, C. Hamciuc, M. Cazacu, M. Ignat and G. Zarnescu, European Polymer Journal **45** (1), 182-190 (2009).
19. M. M. A. Kechik, P. Mikheenko, A. Sarkar, V. S. Dang, N. H. Babu, D. A. Cardwell, J. S. Abell and A. Crisan, Superconductor Science & Technology **22** (3) (2009).
20. S. N. Khaderi, M. Baltussen, P. D. Anderson, D. Ioan, J. M. J. den Toonder and P. R. Onck, Physical Review E **79** (4) (2009).
21. R. Khandelwal, A. P. Singh, A. Kapoor, S. Grigorescu, P. Miglietta, N. E. Stankova and A. Perrone, Optics and Laser Technology **41** (1), 89-93 (2009).
22. S. Lefrant, M. Baibarac and I. Baltog, Journal of Materials Chemistry **19** (32), 5690-5704 (2009).
23. Z. R. Li, H. R. Kandel, E. Dervishi, V. Saini, Y. Xu, A. R. Biris, D. Lupu, G. J. Salamo and A. S. Biris, Langmuir **24** (6), 2655-2662 (2008).
24. Z. R. Li, V. P. Kunets, V. Saini, Y. Xu, E. Dervishi, G. J. Salamo, A. R. Biris and A. S. Biris, Applied Physics Letters **93** (24) (2008).
25. D. Macocinschi, D. Filip, M. Butnaru and C. D. Dimitriu, Journal of Materials Science-Materials in Medicine **20** (3), 775-783 (2009).
26. J. Madarasz, A. Braileanu, M. Crisan and G. Pokol, Journal of Analytical and Applied Pyrolysis **85** (1-2), 549-556 (2009).
27. J. Madarasz, A. Braileanu and G. Pokol, Journal of Analytical and Applied Pyrolysis **82** (2), 292-297 (2008).
28. A. Marcu, T. Yanagida, K. Nagashima, K. Oka, H. Tanaka and T. Kawai, Applied Physics Letters **92** (17) (2008).
29. D. Mardare, N. Iftimie and D. Luca, Journal of Non-Crystalline Solids **354** (35-39), 4396-4400 (2008).
30. P. Mikheenko, A. Sarkar, V. S. Dang, J. L. Tanner, J. S. Abell and A. Crisan, Physica C-Superconductivity and Its Applications **469** (14), 798-804 (2009).
31. V. Musat, E. Fortunata, S. Petrescu and A. M. B. do Rego, Physica Status Solidi a-Applications and Materials Science **205** (8), 2075-2079 (2008).
32. V. Musat, A. M. Rego, R. Monteiro and E. Fortunato, Thin Solid Films **516** (7), 1512-1515 (2008).
33. M. Nistor, N. B. Mandache and J. Perriere, Journal of Physics D-Applied Physics **41** (16) (2008).
34. L. Pintilie, K. Boldyreva, M. Alexe and D. Hesse, New Journal of Physics **10** (2008).
35. L. Pintilie, K. Boldyreva, M. Alexe and D. Hesse, Journal of Applied Physics **103** (2) (2008).
36. L. Pintilie, C. Dragoi, Y. H. Chu, L. W. Martin, R. Ramesh and M. Alexe, Applied Physics Letters **94** (23) (2009).
37. L. Pintilie, I. Vrejoiu, D. Hesse and M. Alexe, Journal of Applied Physics **104** (11) (2008).
38. J. C. Pivin, G. Socol, I. Mihailescu, P. Berthet, F. Singh, M. K. Patel and L. Vincent, Thin Solid Films **517** (2), 916-922 (2008).
39. A. Rotaru, C. Constantinescu, P. Rotaru, A. Moanta, M. Dumitru, M. Socaciu, M. Dinescu and E. Segal, Journal of Thermal Analysis and Calorimetry **92** (1), 279-284 (2008).
40. A. Rotaru, A. Kropidlowska, A. Moanta, P. Rotaru and E. Segal, Journal of Thermal Analysis and Calorimetry **92** (1), 233-238 (2008).
41. N. Scarisoreanu, F. Craciun, V. Ion, S. Birjega and M. Dinescu, Applied Surface

Science **254** (4), 1292-1297 (2007).
42. E. M. Seftel, E. Popovici, M. Mertens, K. Witte, G. Tendeloo, P. Cool and E. F. Vansant, Microporous and Mesoporous Materials **113** (1-3), 296-304 (2008).
43. N. Spataru, X. T. Zhang, T. Spataru, D. A. Tryk and A. Fujishima, Journal of the Electrochemical Society **155** (3), B264-B269 (2008).
44. G. E. Stan, C. O. Morosanu, D. A. Marcov, I. Pasuk, F. Miculescu and G. Reumont, Applied Surface Science **255** (22), 9132-9138 (2009).
45. C. Surdu-Bob, R. Vladoiu, M. Badulescu and G. Musa, Diamond and Related Materials **17** (7-10), 1625-1628 (2008).
46. D. Tanaskovic, B. Jokic, G. Socol, A. Popescu, I. N. Mihailescu, R. Petrovic and D. Janackovic, Applied Surface Science **254** (4), 1279-1282 (2007).
47. V. S. Teodorescu and M. G. Blanchin, Microscopy and Microanalysis **15** (1), 15-19 (2009).
48. C. Trapalis, N. Todorova, M. Anastasescu, C. Anastasescu, M. Stoica, M. Gartner, M. Zaharescu and T. Stoica, Thin Solid Films **517** (23), 6243-6247 (2009).
49. C. Vladuta, L. Andronic, M. Visa and A. Duta, Surface & Coatings Technology **202** (11), 2448-2452 (2008).
50. A. Yildiz, S. B. Lisesivdin, M. Kasap and D. Mardare, Journal of Non-Crystalline Solids **354** (45-46), 4944-4947 (2008).

Alte referinte:

- Title: Comparison between ZnO films grown by femtosecond and nanosecond laser ablation, Author(s): Perriere J, Millon E, Seiler W, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **91** Issue: **2** Pages: **690-696** Published: **JAN 15 2002** **citata de 85 ori**
- Title: Laser ablation of dielectrics with temporally shaped femtosecond pulses, Author(s): Stoian R, Boyle M, Thoss A, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **80** Issue: **3** Pages: **353-355** Published: **JAN 21 2002** **citata de 83 ori**
- Title: Growth of aligned carbon nanotubes by plasma-enhanced chemical vapor deposition: Optimization of growth parameters, Author(s): Tanemura M, Iwata K, Takahashi K, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **90** Issue: **3** Pages: **1529-1533** Published: **AUG 1 2001** **citata de 64 ori**
- Title: Growth and characterization of low-temperature grown GaN with high Fe doping, Author(s): Akinaga H, Nemeth S, De Boeck J, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **77** Issue: **26** Pages: **4377-4379** Published: **DEC 25 2000** **citata de 59 de ori**
- Title: Pulsed laser deposition of hydroxyapatite thin films on Ti-5A1-2.5Fe substrates with and without buffer layers, Author(s): Nelea V, Ristoscu C, Chiritescu C, et al., Source: **APPLIED SURFACE SCIENCE** Volume: **168** Issue: **1-4** Pages: **127-131** Published: **DEC 15 2000** **citata de 51 de ori**
- Title: Al-doped ZnO thin films by sol-gel method, Author(s): Musat V, Teixeira B, Fortunato E, et al., Source: **SURFACE & COATINGS TECHNOLOGY** Volume: **180** Pages: **659-662** Published: **MAR 1 2004** **citata de 49 de ori**
- Title: In situ transmission electron microscopy study of Ni silicide phases formed on (001) Si active lines, Author(s): Teodorescu V, Nistor L, Bender H, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **90** Issue: **1** Pages: **167-174** Published: **JUL 1 2001** **citata de 56 de ori**
- Title: Screening-photovoltaic bright solitons in lithium niobate and associated single-mode waveguides, Author(s): Fazio E, Renzi F, Rinaldi R, et al., Source: **APPLIED PHYSICS**

LETTERS Volume: **85** Issue: **12** Pages: **2193-2195** Published: **SEP 20 2004**
citata de 84 ori

- Title: Surface anisotropy in ferromagnetic nanoparticles, Author(s): Labaye Y, Crisan O, Berger L, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **91** Issue: **10** Pages: **8715-8717** Part: **Part 3** Published: **MAY 15 2002** **citata de 60 de ori**

- Title: Magnetic characterization of nanocrystalline Ni-Zn ferrite powder prepared by the glyoxylate precursor method, Author(s): Caizer C, Stefanescu M, Source: **JOURNAL OF PHYSICS D-APPLIED PHYSICS** Volume: **35** Issue: **23** Pages: **3035-3040** Published: **DEC 7 2002** **citata de 59 de ori**

- Title: Micromagnetic and Preisach analysis of the First Order Reversal Curves (FORC) diagram, Author(s): Stancu A, Pike C, Stoleriu L, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **93** Issue: **10** Pages: **6620-6622** Part: **Part 2** Published: **MAY 15 2003** **citat de 48 de ori**

- Title: Thermally stimulated current method applied on diodes with high concentration of deep trapping levels, Author(s): Pintilie I, Pintilie L, Moll M, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **78** Issue: **4** Pages: **550-552** Published: **JAN 22 2001** **citata de 22 de ori**

- Title: Sputtered nanodots: A costless method for inducing effective pinning centers in superconducting thin films, Author(s): Crisan A, Fujiwara S, Nie JC, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **79** Issue: **27** Pages: **4547-4549** Published: **DEC 31 2001,** **citata de 64 ori**

- Title: Formation of the Z(1,2) deep-level defects in 4H-SiC epitaxial layers: Evidence for nitrogen participation, Author(s): Pintilie I, Pintilie L, Irmscher K, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **81** Issue: **25** Pages: **4841-4843** Published: **DEC 16 2002** **citata de 48 de ori**

- Title: Effect of ablated particle flux on MgO nanowire growth by pulsed laser deposition, Author(s): Marcu A, Yanagida T, Nagashima K, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **102** Issue: **1** Article Number: **016102** Published: **JUL 1 2007** **citata de 20 de ori**

Popescu, M; Sava, F; Lorinczi, A, Socol G, Mihailescu IN, Tomescu A, Structure, properties and gas sensing effect of SnSe2 films prepared by pulsed laser deposition method, Conference Information: 10th International Conference on the Structure of Non-Crystalline Materials (NCM 10), Date: SEP 18-22, 2006 Prague CZECH REPUBLIC, JOURNAL OF NON-CRYSTALLINE SOLIDS Volume: 353 Issue: 18-21 Pages: 1865-1869 (2007)
Times Cited: 3

Simandan, ID; Popescu, M; Lorinczi, Velea A, Fagadar-Cosma E, PREPARATION AND PROPERTIES OF BARIUM STEARATE MULTILAYERS WITH CARBON NANOTUBES, MANGANESE PORPHYRIN AND SILVER NITRATE, DIGEST JOURNAL OF NANOMATERIALS AND BIOSTRUCTURES Volume: 5, Issue: 4 Pages: 1029-1033 Published: 2010
Times Cited: 0

Simandan, ID; Sava, F; Velea, A, Langmuir and Langmuir-Blodgett films based on stearic acid, barium stearate and carbon nanotubes, OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS Volume: 4 Issue: 8 Pages: 1178-1181 Published: 2010
Times Cited: 0

Lorinczi, A; Sava, F; Tomescu, A, Simion C, Socol G, Mihailescu IN, Popescu M, (Te/SnSe2)(3) multilayers deposited by pulsed laser deposition. Structure and gas sensing properties, 1st International Workshop on Optoelectronic Techniques for Environmental Monitoring and Risk Assessment, Date: MAY 21-24, 2007 Bucharest ROMANIA,

JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 9 Issue: 11 Pages: 3489-3492 Published: 2007
Times Cited: 0
Popescu, M; Lorinczi, A; Sava, F, Resistive sensor for water salinity, JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS, Volume: 9 Issue: 12 Pages: 3954-3956 Published: 2007
Times Cited: 0

Patents:

"Procedeu de preparare a unui material sensibil la nitratul de amoniu in solutie apoasa si sensor de nitrat de amoniu bazat pe nanotuburi de carbon functionalizate cu stearat de bariu", I. D. Simandan, **M. Popescu**, A. Velea, A. Lőrinczi, Patent request at OSIM No. A/01014/26.10.**2010**.

"Selective sensor for lead ions in aqueous solutions", **M. Popescu**, A. Lőrinczi, E. Apostol, F. Sava, E. Ion, A. Velea, G. Socol, I.N. Mihailescu, Patent request at OSIM No. A/2007-00825 / 30.11.**2007**.

"Sensible material for methan gas and threshold sensor for methan gas detection", **M. Popescu**, F. Sava, A. Lőrinczi, A. Tomescu, C. Simion, G. Socol, I.N. Mihailescu, S. Miclos, D. Savastru, Patent request at OSIM No. A00941 / 05.12.**2006**.

Tema 2: Materiale pentru aplicatii in electronica, biologie, medicina, optica, comunicatii, energie, automatizari, mediu, metode de studiu

Subiectul 2.1: Biomateriale
Subiectul 2.2: Materiale feroice si multiferoice
Subiectul 2.3: Materiale dielectrice
Subiectul 2.4: Cristale lichide, moleculare si polimeri
Subiectul 2.5: Nanocomposite, multistraturi, super-retele
Subiectul 2.6: Materiale semiconductoare
Subiectul 2.7: Solide in stare amorfa: fenomene si aplicatii

Context: Realizari recente si perspective (la nivel international):

O arie de larg interes la nivel international este dezvoltarea de materiale si structuri functionale si multifunctionale cu aplicabilitate directa in electronica, comunicatii, medicina, energie, mediu, etc. Provocarile actuale necesita abordari multidisciplinare care includ si dezvoltarea de noi materiale capabile sa inlocuiasca materiile prime in curs de epuizare, sa creasca eficienta energetica, sa protejeze mediul inconjurator sau sa se interfateze usor cu sistemele vii. De mare viitor sunt materialele complexe de tip nanocompozite, metamateriale, super-retele si heterostructuri care pot dobandi functionalitati noi sau mult imbunatatite fata de cele ale fazelor componente. Cateva exemple: materiale dielectrice low-k si high-k pentru electronica si telecomunicatii; materiale de tip multiferoic artificial pentru memorii cu stari multiple si pentru electronica de spin; materiale nanofunctionalizate utilizate in industria textila, cosmetica sau famaceutica pentru protectia termica, la radiatii UV, etc.; diferite materiale si structuri utilizate in conversia energiilor termice, mecanice, luminoase in energie electrice; materiale pentru stocare de informatie si energie si multe altele.

Context: Realizari recente si perspective (la nivel national):

La nivel national au fost obtinute rezultate semnificative in obtinerea si caracterizarea unor materiale si structuri multifunctionale cu aplicabilitate in electronica, energetica, medicina, comunicatii. Au fost dezvoltate si caracterizate o serie de materiale feroelectrice/piezoelectrice, dielectrice, semiconductoare atat sub forma de cristal sau ceramica cat si sub forma de straturi subtiri, multistraturi sau compozite, fie policristaline fie amorfe. In ultimul timp au aparut realizari si in domeniul compozitelor de tip organic-inorganic sau in ceea ce priveste electronica cu polimeri. Noile infrastructuri de cercetare dezvoltate in ultimul timp vor permite aprofundarea studiilor in domeniul materialelor si structurilor multifunctionale, permitand o corelare mai buna intre analizele structurale, de compozitie si rezultatele investigarii proprietatilor fizice, cu feadback direct catre tehnicile de preparare. Este recomandabila organizarea de retele tematice, pentru o mai buna exploatare a infrastructurilor existente, apte sa dezvolte aplicatii concrete ale materialelor multifunctionale in domenii de interes pentru economia si societatea romaneasca.

Cuvânt cheie	Total articole în lume 2008-2011	h-index	Nr. mediu citări/articol	Total articole RO 2008-2011	h-index RO	Nr. mediu de citări/articol RO	Nr. articole RO cu mai mult de 5

							citări
biomaterials	6.664	44	3.72	141	6	1.46	10
multiferroic materials	381	18	5.13	5	2	1.60	1
dielectric materials	6.504	34	2.33	74	3	0.62	1
nanocomposite	11.311	N/A	N/A	137	7	1.15	11
multilayers	5.485	38	3.16	54	5	1.02	5
semiconductors	20.010	N/A	N/A	110	5	1.65	6

Pentru cuvintele cheie cu foarte multe articole publicate în lume în perioada selectată (2008 – 2011) nu s-a putut efectua o analiză de tip „Citation Report" şi implicit nu am putut calcula h-index-ul corespunzător şi nr. mediu de citări per articol. În aceste cazuri am trecut în tabel valoarea „N/A" – „not available".

Referinte

Nr. Crt.	Titlul articolului	Autori	Anul aparitiei	Revista	Citari
1	Effects of LP-MOCVD prepared TiO2 thin films on the in vitro behavior of gingival fibroblasts	Cimpean, A., Popescu, S., Ciofrangeanu, C.M., Gleizes, A.N.	2011	*Materials Chemistry and Physics* 125 (3), pp. 485-492	0
2	Milling effects on hybrid collagen / inorganic phase composites	Dindelegan, G., Popa, C., Brie, I., Magyari, K., Simon, V.	2011	*Materials Science Forum* 672, pp. 129-132	0
3	Chemical modification of chloromethylated polysulfones via click reactions	Gaina, C., Gaina, V., Ionita, D.	2011	*Polymer International* 60 (2), pp. 296-303	0
4	XPS study of protein adsorption onto nanocrystalline aluminosilicate microparticles	Vanea, E., Simon, V.	2011	*Applied Surface Science* 257 (6), pp. 2346-2352	0
5	Preparation and complex characterization of silica holmium sol-gel monoliths	Cacaina, D., Areva, S., Laaksonen, H., Simon, S., Ylänen, H.	2011	*Journal of Materials Science: Materials in Medicine* 22 (1), pp. 29-40	0
6	Ormosils scaffolds produced by laser processing for fibroblast cell growth	Matei, A., Dinescu, M., Buruiana, E.C., Buruiana, T., Petcu, I., Mustaciosu, C.	2011	*Digest Journal of Nanomaterials and Biostructures* 6 (1), pp. 29-35	0
7	Placental stem cell differentiation into	Şuşman, S., Soriţău, O., Rus-	2010	*Romanian Journal of Morphology and*	0

	islets of Langerhans-like glucagon-secreting cells	Ciucă, D., Tomuleasa, C., Pop, V.I., Mihu, C.M.		*Embryology* 51 (4), pp. 733-738	
8	Regenerative medicine versus conventional auto/allografts in bone reconstruction as an option for enhanced quality of life	Lucaciu, D., Todor, A., Baciut, G., Baciut, M., Campeanu, R., Lucaciu, O.	2010	*Proceedings - 2nd Advanced Technologies for Enhanced Quality of Life, ATEQUAL 2010* , art. no. 5663602, pp. 58-63	0
9	A computer simulation study of cell seeding of a porous biomaterial	Robu, A.P., Neagu, A., Stoicu-Tivadar, L.	2010	*ICCC-CONTI 2010 - IEEE International Joint Conferences on Computational Cybernetics and Technical Informatics, Proceedings* , art. no. 5491294, pp. 225-229	0
10	Gelatin hydrogels with PAMAM nanostructured surface and high density surface-localized amino groups	Stancu, I.-C.	2010	*Reactive and Functional Polymers* 70 (5), pp. 314-324	1
11	Biphasic calcium sulfate dihydrate/iron-modified alpha-tricalcium phosphate bone cement for spinal applications: In vitro study	Vlad, M.D., Valle, L.J., Poeată, I., López, J., Torres, R., Barracó, M., Fernndez, E.	2010	*Biomedical Materials* 5 (2), art. no. 025006	0
12	Tissue engineered bone versus alloplastic commercial biomaterials in craniofacial reconstruction	Lucaciu, O., Mihaela, B., Băciuț, G., Câmpian, R., Soriță̆u, O., Bran, S., Crişan, B., Liana, C.	2010	*Romanian Journal of Morphology and Embryology* 51 (1), pp. 129-136	0
13	Gelatin hydrogels with PAMAM nanostructured surface and high density surface-localized amino groups	Stancu, I.-C.	2010	*Reactive and Functional Polymers* Article in Press	0
14	Soft chemical methods integration with micro fabrication in	Piticescu, R.M., Buruiana, T., Plesu, N., Vasile,	2010	*Optoelectronics and Advanced Materials, Rapid*	0

	developing new scaffolds for tissue engineering	E., Moldovan, C., Fartat, B., Rusti, C.		*Communications* 4 (3), pp. 401-406	
15	Collagen-chondroitin sulfate-hydroxyapatite porous composites: preparation, characterization and in vitro biocompatibility testing	Moldovan, L., Craciunescu, O., Oprita, E.I., Balan, M., Zarnescu, O.	2009	*Romanian Biotechnological Letters* 14 (3), pp. 4459-4466	1
16	Atomic environment in sol-gel derived nanocrystalline hydroxyapatite	Simon, V., Lazăr, D., Turcu, R.V.F., Mocuta, H., Magyari, K., Prinz, M., Neumann, M., Simon, S.	2009	*Materials Science and Engineering B: Solid-State Materials for Advanced Technology* 165 (3), pp. 247-251	2
17	Surface functionalisation of sol-gel derived aluminosilicates in simulated body fluids	Simon, V., Cavalu, S., Simon, S., Mocuta, H., Vanea, E., Prinz, M., Neumann, M.	2009	*Solid State Ionics* 180 (9-10), pp. 764-769	3
18	Thermal kinetics analysis of bone tissue organic phase	Tămăşan, M., Băciuţ, M., Coman, V., Simon, V.	2009	*Journal of Optoelectronics and Advanced Materials* 11 (4), pp. 479-483	1
19	Bone regeneration in craniofacial reconstruction with particulate grafts obtained through tissue engineering	Lucaciu, O., Baciut, M., Baciut, G., Gheban, D., Bran, S., Hedesiu, M., Nicola, C., (...), Gui, D.	2009	*Particulate Science and Technology* 27 (6), pp. 497-518	0
20	Phosphorus containing hydrogels	Ilia, G.	2009	*Polymers for Advanced Technologies* 20 (9), pp. 707-722	2
21	Surface analysis of some amphiphile polyurethanes	Filip, D., Vlad, S., Macocinschi, D.	2009	*Journal of Optoelectronics and Advanced Materials* 11 (5), pp. 681-688	4
22	Tissue engineering for cartilage regeneration; stem cells, scaffolds and bioreactors	Simion, L., Botez, P., Zugun-Eloae, F.	2009	*Archives of the Balkan Medical Union* 44 (1), pp. 44-50	0
23	Transplantation of mesenchymal stem cells cultured on biomatrix support induces repairing of digestive tract defects,	Sîrbu-Boeţi, M.P., Chivu, M., Pâslaru, L.L., Efrimescu, C., Herlea, V., Pecheanu, C., Moldovan, L., (...),	2009	*Chirurgia (Bucharest, Romania : 1990)* 104 (1), pp. 55-65	0

	in animal model.	Popescu, I.			
24	Specific biofunctional performances of the hydroxyapatite-sodium maleate copolymer hybrid coating nanostructures evaluated by in vitro studies	Sima, L.E., Filimon, A., Piticescu, R.M., Chitanu, G.C., Suflet, D.M., Miroiu, M., Socol, G., (...), Negroiu, G.	2009	*Journal of Materials Science: Materials in Medicine* 20 (11), pp. 2305-2316	0
25	The kinetics of cell adhesion to solid scaffolds: An experimental and theoretical approach	Doagă, I.O., Savopol, T., Neagu, M., Neagu, A., Kovács, E.	2008	*Journal of Biological Physics* 34 (5), pp. 495-509	1
26	Functionalized Chitosan and its use in pharmaceutical, biomedical, and biotechnological research	Enescu, D., Olteanu, C.E.	2008	*Chemical Engineering Communications* 195 (10), pp. 1269-1291	9
27	Tissue engineering by self-assembly of cells printed into topologically defined structures	Jakab, K., Norotte, C., Damon, B., Marga, F., Neagu, A., Besch-Williford, C.L., Kachurin, A., (...), Forgacs, G.	2008	*Tissue Engineering - Part A*. 14 (3), pp. 413-421	25
28	Silver release from hydroxyapatite self-assembling calcium-phosphate glasses	Simon, V., Albon, C., Simon, S.	2008	*Journal of Non-Crystalline Solids* 354 (15-16), pp. 1751-1755	6
29	Recent advancements in biomaterials and medical devices, aiming to improve consistently the outcomes of therapeutic approaches within spine/cord injury	Onose, G., Ciurea, A.V., Rizea, R.E., Chendreani, C., Anghelescu, A., Haras, M., Brehar, F., Padure, L.	2008	*Journal of Optoelectronics and Advanced Materials* 10 (1), pp. 18-28	2
30	"In vitro" study of a new composite biomaterial for indirect restorations	Popovici, A., Fodor, O., Moldovan, M., Roman, A., Borzea, D.	2008	*Optoelectronics and Advanced Materials, Rapid Communications* 2 (12), pp. 891-894	1
31	Biocompatibility evaluation of a novel hydroxyapatite-polymer coating for medical implants (in vitro tests)	Negroiu, G., Piticescu, R.M., Chitanu, G.C., Mihailescu, I.N., Zdrentu, L., Miroiu, M.	2008	*Journal of Materials Science: Materials in Medicine* 19 (4), pp. 1537-1544	12
32	Creatinine biomaterial	György, E.,	2008	*Journal of Materials*	3

	thin films grown by laser techniques	Axente, E., Mihailescu, I.N., Predoi, D., Ciuca, S., Neamtu, J.		*Science: Materials in Medicine* 19 (3), pp. 1335-1339	
33	Biomolecular papain thin films growth by laser techniques	György, E., Santiso, J., Figueras, A., Socol, G., Mihailescu, I.N.	2007	*Journal of Materials Science: Materials in Medicine 18 (8), pp. 1643-1647*	*4*
34	Investigation of deer antler as a potential bone regenerating biomaterial	Băciuț, M., Băciuț, G., Simon, V., Albon, C., Coman, V., Prodan, P., Florian, Ș.T.I., Bran, S.	2007	*Journal of Optoelectronics and Advanced Materials* 9 (8), pp. 2547-2550	5
35	Bone tissue: A relationship between micro and nano structural composition and its corresponding electrostatic properties with applications in tissue engineering	Jensen, D.B., Li, Z., Pavel, I., Dervishi, E., Biris, A.S., Jensen, P.J., Biris, A.R., Lupu, D.	2007	*Conference Record - IAS Annual Meeting (IEEE Industry Applications Society)* , art. no. 4347767, pp. 55-59	0
36	Developmental biology and tissue engineering	Marga, F., Neagu, A., Kosztin, I., Forgacs, G.	2007	*Birth Defects Research Part C - Embryo Today: Reviews* 81 (4), pp. 320-328	10
37	Synthesis of poly(vinyl alcohol) - Methyl cellulose hydrogel as possible scaffolds in tissue engineering	Ivanov, C., Popa, M., Ivanov, M., Popa, A.A.	2007	*Journal of Optoelectronics and Advanced Materials* 9 (11), pp. 3440-3444	1
38	Matrix assisted pulsed laser evaporation of pullulan tailor-made biomaterial thin films for controlled drug delivery systems	Cristescu, R., Jelinek, M., Kocourek, T., Axente, E., Grigorescu, S., Moldovan, A., Mihaiescu, D.E., (...), Chrisey, D.B.	2007	*Journal of Physics: Conference Series* 59 (1), art. no. 031, pp. 144-149	1
39	Pulsed laser deposition of hydroxyapatite thin films	Koch, C.F., Johnson, S., Kumar, D., Jelinek, M., Chrisey, D.B., Doraiswamy, A., Jin, C., (...), Mihailescu, I.N.	2007	*Materials Science and Engineering C* 27 (3), pp. 484-494	12
40	Gold and silver/Si	Kleps, I., Danila,	2007	*Materials Science*	6

	nanocomposite layers	M., Angelescu, A., Miu, M., Simion, M., Ignat, T., Bragaru, A., (...), Teodosiu, G.		*and Engineering C* 27 (5-8 SPEC. ISS.), pp. 1439-1443	
41	Polymers for multifunctional textiles	Visileanu, E., Ene, A., Mihai, C., Kowalczuk, M.	2006	*Macromolecular Symposia* 242, pp. 295-306	0
42	Three-dimensional tissue constructs built by bioprinting	Jakab, K., Damon, B., Neagu, A., Kachurin, A., Forgacs, G.	2006	*Biorheology* 43 (3-4), pp. 509-513	13
43	A bioactive collagen-β tricalcium phosphate scaffold for tissue engineering	Oprita, E.I., Moldovan, L., Craciunescu, O., Buzgariu, W., Tardei, C., Zarnescu, O.	2006	*Central European Journal of Biology* 1 (1), pp. 61-72	8
44	Microphotonic structures based on poly(vinyl alcohol) polymer for chemo-and bio-sensors	Obreja, P., Manea, E., Budianu, E., Rebigan, R., Kusko, M., Cristea, D.	2005	*Proceedings of SPIE - The International Society for Optical Engineering* 5972, art. no. 59720Y	0
45	Titanium - Hydroxyapatite porous structures for endosseous applications	Popa, C., Simon, V., Vida-Simiti, I., Batin, G., Candea, V., Simon, S.	2005	*Journal of Materials Science: Materials in Medicine* 16 (12), pp. 1165-1171	9
46	Biocompatible Mn2+-doped carbonated hydroxyapatite thin films grown by pulsed laser deposition	György, E., Toricelli, P., Socol, G., Iliescu, M., Mayer, I., Mihailescu, I.N., Bigi, A., Werckman, J.	2004	*Journal of Biomedical Materials Research - Part A* 71 (2), pp. 353-358	12
47	Human osteoblast response to pulsed laser deposited calcium phosphate coatings	Bigi, A., Bracci, B., Cuisinier, F., Elkaim, R., Fini, M., Mayer, I., Mihailescu, I.N., (...), Torricelli, P.	2005	*Biomaterials* 26 (15), pp. 2381-2389	64
48	Laser processing of advanced bioceramics	Narayan, R.J., Jin, C., Doraiswamy, A., Mihailescu, I.N., Jelinek, M., Ovsianikov, A., Chichkov, B., Chrisey, D.B.		*Advanced Engineering Materials* 7 (12), pp. 1083-1098	29

- Title: New materials for micro-scale sensors and actuators An engineering review, Author(s): Wilson SA, Jourdain RPJ, Zhang Q, et al., Source: **MATERIALS SCIENCE &**

ENGINEERING R-REPORTS Volume: **56** Issue: **1-6** Pages: **1-129** Published: **JUN 21 2007** **citata de 56 de ori**

- Title: Competition between ferroelectric and semiconductor properties in Pb(Zr0.65Ti0.35)O-3 thin films deposited by sol-gel, Author(s): Boerasu I, Pintilie L, Pereira M, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **93** Issue: **8** Pages: **4776-4783** Published: **APR 15 2003** **citata de 40 de ori**

- Title: Analysis of the composition-induced transition from relaxor to ferroelectric state in PbFe2/3W1/3O3-PbTiO3 solid solutions, Author(s): Mitoseriu L, Stancu A, Fedor C, et al., Source: **JOURNAL OF APPLIED PHYSICS** Volume: **94** Issue: **3** Pages: **1918-1925** Published: **AUG 1 2003** **citata de 25 de ori**

- Title: Local switching properties of dense nanocrystalline BaTiO3 ceramics, Author(s): Mitoseriu L, Harnagea C, Nanni P, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **84** Issue: **13** Pages: **2418-2420** Published: **MAR 29 2004** **citata de 36 de ori**

- Title: Lead-based ferroelectric compounds deposited by PLD, Author(s): Scarisoreanu N, Craciun F, Dinescu G, et al., Source: **THIN SOLID FILMS** Volume: **453** Pages: **399-405** Published: **APR 1 2004** **citata de 21 de ori**

- Title: PREPARATION AND ELECTRO-THERMOCONDUCTIVE CHARACTERISTICS OF MAGNETORHEOLOGICAL SUSPENSIONS, Author(s): Bica I, Choi HJ, Source: **INTERNATIONAL JOURNAL OF MODERN PHYSICS B** Volume: **22** Issue: **29** Pages: **5041-5064** Published: **NOV 20 2008** **citata de 21 de ori**

- Title: Laser emission under resonant pump in the emitting level of concentrated Nd : YAG ceramics, Author(s): Lupei V, Lupei A, Pavel N, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **79** Issue: **5** Pages: **590-592** Published: **JUL 30 2001** **citata de 68 ori**

- Title: Laser operation with near quantum-defect slope efficiency in Nd : YVO4 under direct pumping into the emitting level, Author(s): Sato Y, Taira T, Pavel N, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **82** Issue: **6** Pages: **844-846** Published: **FEB 10 2003** **citata de 68 ori**

- Title: Room temperature growth of indium tin oxide thin films by ultraviolet-assisted pulsed laser deposition, Author(s): Craciun V, Craciun D, Chen Z, et al., Source: **APPLIED SURFACE SCIENCE** Volume: **168** Issue: **1-4** Pages: **118-122** Published: **DEC 15 2000** **citata de 21 de ori**

- Title: The surface oxidation of selected polymers using an atmospheric pressure air dielectric barrier discharge. Part I, Author(s): Borcia G, Anderson CA, Brown NMD, Source: **APPLIED SURFACE SCIENCE** Volume: **221** Issue: **1-4** Pages: **203-214** Published: **JAN 15 2004** **citata de 40 de ori**

- Title: Electrochemically functionalized carbon nanotubes and their application to rechargeable lithium batteries, Author(s): Baibarac M, Lira-Cantu M, Oro-Sole J, et al., Source: **SMALL** Volume: **2** Issue: **8-9** Pages: **1075-1082** Published: **AUG 2006** **citata de 21 de ori**

- Title: Nanocomposites based on conducting polymers and carbon nanotubes: From fancy materials to functional applications, Author(s): Baibarac M, Gomez-Romero P, Source: **JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY** Volume: **6** Issue: **2** Pages: **289-302** Published: **FEB 2006** **citata de 61 ori**

- Title: Effects of insertion of strain-mediating layers on luminescence properties of 1.3-mu m GaInNAs/GaNAs/GaAs quantum-well structures, Author(s): Pavelescu EM, Peng CS, Jouhti T, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **80** Issue: **17** Pages: **3054-3056** Published: **APR 29 2002** **citata de 59 de ori**

- Title: Radiation hard silicon detectors - developments by the RD48 (ROSE) collaboration, Author(s): Lindstrom G, Ahmed M, Albergo S, et al., Source: **NUCLEAR INSTRUMENTS**

& METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT Volume: **466** Issue: **2** Pages: **308-326** Published: **JUL 1 2001** **citata de 226 de ori**

- Title: Developments for radiation hard silicon detectors by defect engineering - results by the CERN RD48 (ROSE) Collaboration, Author(s): Lindstrom G, Ahmed M, Albergo S, et al., Source: **NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT** Volume: **465** Issue: **1** Pages: **60-69** Published: **JUN 1 2001** **citata de 66 de ori**

- Title: Close to midgap trapping level in Co-60 gamma irradiated silicon detectors, Author(s): Pintilie I, Fretwurst E, Lindstrom G, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **81** Issue: **1** Pages: **165-167** Published: **JUL 1 2002** **citata de 34 de ori**

- Title: Second-order generation of point defects in gamma-irradiated float-zone silicon, an explanation for "type inversion", Author(s): Pintilie I, Fretwurst E, Lindstrom G, et al., Source: **APPLIED PHYSICS LETTERS** Volume: **82** Issue: **13** Pages: **2169-2171** Published: **MAR 31 2003** **citata de 30 de ori**

- Title: Chemically prepared nanocrystalline PbS thin films, Author(s): Pentia E, Pintilie L, Matei I, et al., Source: **JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS** Volume: **3** Issue: **2** Pages: **525-530** Published: **JUN 2001** **citata de 21 de ori**

M. Popescu, “Disordered chalcogenide optoelectronic materials: phenomena and applications”, Journal of Optoelectronics and Advanced Materials, vol. 7(4), 2189 – 2210 (2005).

No. of citations: 32

M. Popescu, “The closed cluster model and the charged coordination defects in chalcogenide glasses”, Journal of Optoelectronics and Advanced Materials, vol. 6(4), 1147-1152 (2004).

No. of citations: 21

Iovu, M; Shutov, S; Rebeja, S, Colomeyco E, Popescu M, Effect of metal additives on photodarkening kinetics in amorphous As_2Se_3 films, Journal of Optoelectronics and Advanced Materials, vol. 2(1), 53-58 (2000).

No. of citations: 11

M. Popescu, “Self-organization in non-crystalline solids”, Journal of Optoelectronics and Advanced Materials, vol. 5(5), 1059-1068 (2003).

No. of citations: 10

M. Popescu, “Chalcogenides - Past, present, future”, Journal of Non-Crystalline Solids, vol. 352(9-20), 887-891 (2006).

No. of citations: 10

M. Popescu, F. Sava, A. Anghel, A. Lorinczi, I. Kaban, W. Hoyer, “Phase-change ovonic switching. A modelling investigation of the structural transition”, Journal of Optoelectronics and Advanced Materials, vol. 7(4), 1743-1748 (2005).

No. of citations: 8

M. Popescu, H. Bradaczek, “Microparacrystalline model for medium-range order in non-crystalline chalcogenides”, Journal of Optoelectronics and Advanced Materials, vol. 3(2), 249-254 (2001).

No. of citations: 8

M. Popescu, “Modelling of the structure and structural transformations in amorphous chalcogenides”, Journal of Optoelectronics and Advanced Materials, vol. 3(2), 279-286 (2001).

No. of citations: 8

Stoica, TF; Stoica, TA; Zaharescu, M, Popescu M, Sava F, Popescu-Pogrion N, Frunza L, Characterization of ITO thin films prepared by spinning deposition starting from a sol-gel process, Conference Information: Romanian Conference on Advanced Materials (ROCAM 2000), Date: OCT 23-25, 2000 BUCHAREST ROMANIA, Journal of Optoelectronics and Advanced Materials, vol 2(5), 684-688 2000.

No. of citations: 8

Popescu, M; Sava, F; Lorinczi, A, Mihailescu IN, Socol G, Axente E, Kaban I, Hoyer W, Amorphous thin films based on paraffin doped chalcogenides, prepared by pulsed laser deposition, Journal of Optoelectronics and Advanced Materials, vol. 6(1), 163-167 (2004).

No. of citations: 7

Popescu, M; Leonovici, M., Paracrystallinity or randomness: a challenge for noncrystalline structure, Journal of Optoelectronics and Advanced Materials, Vol. 8(5), 1831-1837 (2006).

No. of citations: 6

Popescu, M; Sava, F; Lorinczi, A, Savastru D, Miclos S, Savastru R, Microspheres, planoconvex microlenses and optical fibres based on glassy As_2S_3, Journal of Optoelectronics and Advanced Materials, vol. 7(2), 1103-1106 (2005).

No. of citations: 6

Shpotyuk, O; Kovalskiy, A; Kavetskyy, T, Golovchak R, Popescu M., Chemical interaction of chalcogenide vitreous semiconductors with absorbed impurities induced by gamma-irradiation, Journal of Optoelectronics and Advanced Materials, vol. 5(5), 1181-1185, (2003)

No. of citations: 6

Popescu, M; Iovu, M; Hoyer, W, Shpotyuk O, Sava F, Lorinczi A, UV irradiation effects in pure and tin-doped amorphous AsSe films, Journal of Optoelectronics and Advanced Materials, vol. 3(2), 303-306 (2001).

No. of citations: 6

Popescu, M; Hoyer, W, Structural features and mechanism of reversible photoinduced transformations in amorphous chalcogenides, Journal of Optoelectronics and Advanced Materials, vol. 4(4), 867-873 (2002)

No. of citations: 5

M. Popescu, A. Velea, F. Sava, A. Lorinczi, A. Tomescu, C. Simion, E. Matei, G. Socol, I. N. Mihailescu, A. Andonie, I. Stamatin, Structure and properties of silver doped SnSe2 and Ge2Sb2Te5 thin films prepared by pulsed laser deposition PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE, 207(3) , p. 516-520, 2010

I. Bibicu, A. Lorinczi, A. Velea, F. Sava, M. Popescu, Structure and Mossbauer measurements on SnSe2 bulk and thin films, OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS, 4(10), p. 1568-1571, 2010

M. Popescu, A. Velea, C. Mihai, S. Tivadar, "Quantitative structure-activity relationship in antidiabetic drugs by using topological descriptors", Digest Journal of Nanomaterials and Biostructures, 5(3), p. 629-633, 2010

M. Popescu, A. Velea, A. Lorinczi, Biogenic production of nanoparticles, Digest Journal of Nanomaterials and Biostructures, 5(4), p. 1035-1040, 2010

M. Popescu, A. Velea, A. Lorinczi, M. Zamfirescu, F. Jipa, S. Miclos, A. Popescu, M. Ciobanu, D. Savastru, Two-dimensional photonic structures based on As-S chalcogenide glass, Digest Journal of Nanomaterials and Biostructures, 5(4), p. 1101-1105, 2010

A. Lorinczi, A. Velea, E. Matei, I.-D. Simandan, M. Popescu, Structural details of the Ag-As_2S_3 interface obtained by vacuum thermal evaporation followed by green laser irradiation, Chalcogenide Letters, 7(11), p. 609-612, 2010

S. Georgescu, A. M. Voiculescu, S. Salamu, H. Niciu, D. Niciu, M. Popescu, A. Lorinczi, A. Velea, D. Simandan, Synthesis and luminescence properties of Nd-doped chalcogenide glass $(Ge_5As_2S_{13}$ $(NdCl_3)x$ (x=0.3 %, 0.5 %), Chalcogenide Letters, 7(11), p. 621-624 , 2010

H. Niciu, M. Popescu, A. Velea, A. Lorinczi, A. Manea, D. Niciu, M. Lazarescu, Moulding procedure for the preparation of infrared glassy microlenses and prisms based on arsenic sulphide chalcogenide glass, Chalcogenide Letters, 7(11), p. 625-629 , 2010

Patents:

"Method and device for producing chalcogenic microlens", M. Popescu, F. Sava, A. Lőrinczi, S. Micloş, D. Savastru, M. Mustaţa, R. Savastru, Patent request at OSIM No. A00243 / 07.04.2006, Patent granted. Decision No. 6/146/30.11.2009

"Procedeu pentru obtinerea de microelemente optice pentru infrarosu din sticla calcogenica", H. Niciu, D. Niciu, M. Popescu, A. Lőrinczi, A. Velea, A. Manea, M. Lazarescu, Patent request at OSIM No. A/01136 din 19.11.2010;

"Microstructuri fotonice bidimensionale înscrise cu laserul pe suprafeţe de aliaje sticloase calcogenice bazate pe As şi S", M. Popescu, A. Lőrinczi, A. Velea, H. Niciu, M. Zamfirescu, F. Jipa, S. Miclos, M. Ciobanu, D. Savastru, A. Popescu, Patent request at OSIM No. A/01135 din 19.11.2010.

"Complex system with memory cells based on amorphous chalcogenide alloys", M. Popescu, A. Lőrinczi, F. Sava, E. Ion, A. Velea, G. Socol, I. N. Mihailescu, Patent request at OSIM No. A/00724 / 18.09.2008.

"A new procedure for high purity As_2S_3 glass, for optical applications", M. Popescu. F. Sava, A. Lőrinczi, A. Velea, H. Niciu, S. Hermine, D. Radu, Patent request at OSIM No. A/00603 / 05. 08. 2008.

Books:

M. Popescu, Non-Crystalline Chalcogenides, Kluwer , 2000 No. Pages 1-377

Tema 3: Materiale magnetice: proprietăți şi aplicații în biologie, medicină, IT, comunicații, electronică, energie, mediu şi industria auto

Subiectul 3.1: Materiale magnetice cu structuri speciale (inclusiv amorfe şi nanostructurate)
Subiectul 3.2: Fenomene de magnetotransport
Subiectul 3.3: Senzori şi actuatori magnetici (inclusiv bio)
Subiectul 3.4 : Materiale pentru spintronică
Subiectul 3.5: Rezonanță magnetică

Dezvoltarea de noi materiale magnetice, studiul proprietăților acestora şi a diferitelor fenomene ce au loc în astfel de materiale, precum şi realizarea de noi aplicații care utilizează astfel de materiale, aplicații care au o paletă largă de domenii de utilizare - biologie, medicină, IT, comunicații, electronică, energie, mediu, industria auto şi nu numai, constituie preocupări de vârf la nivel mondial. Un avantaj major al cercetărilor realizate în cadrul acestei teme îl constituie faptul că rezultatele obținute pot fi transferate relativ rapid în marea majoritate a domeniilor de utilizare menționate.
În sprijinul celor afirmate vine un număr semnificativ de articole publicate pe plan mondial în perioada 2008 – 2011 în domeniul materialelor şi proprietăților magnetice, respectiv peste 40.000 (rezultat al căutării efectuate pe Web of Science după cuvântul cheie „magnetic properties").
Având în vedere amploarea pe care a luat-o recent dezvoltarea în domenii precum IT şi telecomunicații, industria auto, biomedicină, energie, etc., este foarte clar faptul că perspectiva dezvoltării cercetărilor în domeniul materialelor magnetice şi a aplicațiilor acestora este una extrem de favorabilă, ceea ce face ca menținerea şi creşterea preocupărilor în acest domeniu în România să fie deosebit de importante.
Cele 5 subiecte selectate constituie cele mai de vârf activități din domeniul acestei teme, activități care au perspective extraordinare de dezvoltare în următorii 10 – 15 ani. Acestea sunt elocvente pentru viziunea amplă a temei, acoperind toată gama de cercetări începând cu materialele (subiectele 3.1 şi 3.4), proprietățile şi fenomenele de interes (subiectele 3.2 şi 3.5), şi terminând cu cele mai reprezentative aplicații pentru domeniile de utilizare avute în vedere, respectiv senzorii şi actuatorii magnetici, inclusiv cei biomedicali (subiectul 3.3).
Tabelul cu cuvintele cheie care acoperă şi detaliază cele 5 subiecte reprezintă dovada interesului crescut atât pe plan internațional cât şi pe plan național pentru aceste subiecte. Sigur, există unele cuvinte cheie, cum este „biomagnetic sensors", în care numărul de publicații este redus, însă acestea reprezintă specialități emergente, foarte noi, care vor avea un impact deosebit abia în următorii 5 – 10 ani. Prezența preocupărilor din țară în astfel de specialități emergente este determinantă pentru viitorul fizicii aplicate româneşti.
Există în acelaşi timp specialități în cadrul acestor cinci subiecte în care activitățile cercetătorilor din România sunt mai mult decât vizibile, grupurile din țară fiind la acelaşi nivel cu grupurile din lume cu aceleaşi interese ştiințifice, grupuri cu care de altfel există relații foarte bune de cooperare. Aceste colaborări au un impact pozitiv asupra progresului realizat în respectivele specialități.
Merită de evidențiat specialități cum sunt:

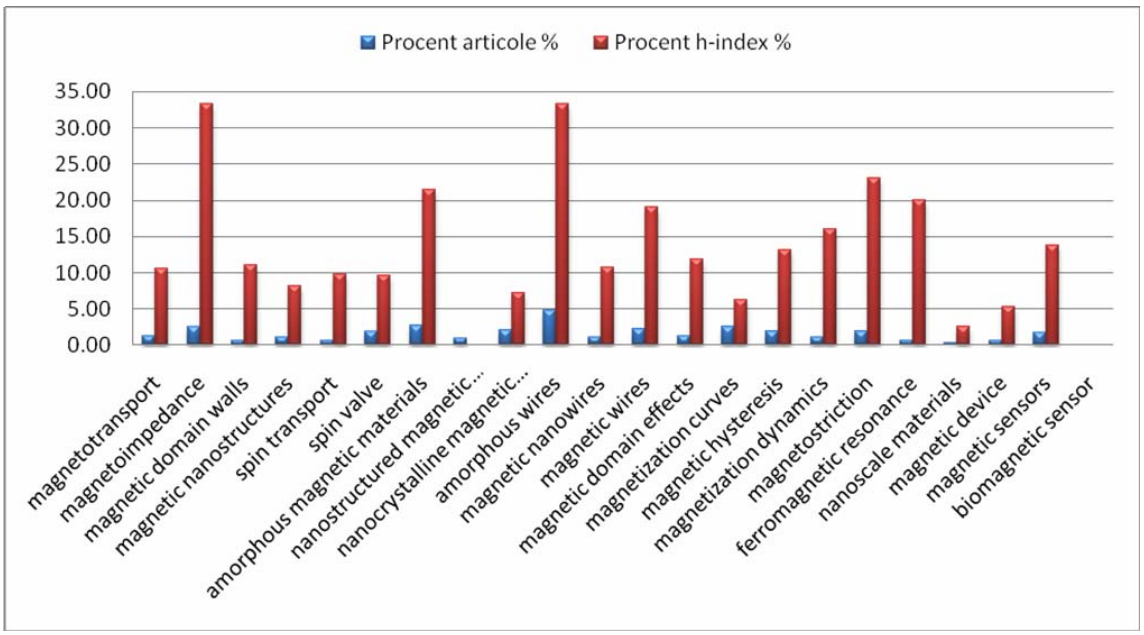
• studiul magneto-impedanței şi al aplicațiilor acestora – fenomen ale cărui particularități şi aplicații în senzori foarte sensibili, cu aplicații inclusiv în magneto-cardiografie, reprezintă o preocupare care a luat o amploare deosebită în ultimii 5 ani;
• materialele magnetice amorfe – materiale versatile sub formă de benzi, pulberi, fire, microfire, nanofire, materiale masive, straturi subțiri, care oferă suportul necesar studiului unui număr foarte mare de efecte şi fenomene specifice, şi care pot constitui elementul sensibil în numeroşi senzori pentru aplicații în domeniile vizate;
• firele amorfe cu proprietăți magnetic moi sau dure – care în particular reprezintă unul din cele mai accesibile materiale pentru aplicații în senzori magnetici;
• materialele magnetostrictive – care oferă suport pentru dezvoltarea unor aplicații biomedicale de mare interes, cum sunt implanturile cohleare sau în domeniul energiei, cum sunt aplicațiile de tip energy harvesting;
• rezonanța feromagnetică – un fenomen al cărui studiu nu numai că permite dezvăluirea unor aspecte specifice materialelor magnetice care sunt dificil de văzut prin alte metode, dar care permite şi dezvoltarea unor aplicații absolut noi în domeniul senzorilor biomedicali.

Am remarcat aceste specialități întrucât în acestea contribuția românească este semnificativă, aşa cum rezultă ea din tabelul cu cuvintele cheie ale temei. Pentru specialitățile menționate, indicele Hirsch al articolelor ştiințifice publicate de autori români are o pondere importantă în indicele Hirsch al articolelor publicate pe plan mondial, acesta fiind cuprins între 20 şi 35% în perioada 2008 – 2011.

De aceea, strategia care ar trebui urmată pe plan intern în perioada următoare este de canalizare a eforturilor pe direcțiile cu potențial ridicat, cum sunt cele date ca exemplu, dar şi altele similare cu contribuție românească semnificativă, şi totodată de dezvoltare a unor direcții emergente, care sunt conexe direcțiilor în care există expertiză, şi care au potențial mare de creştere pe plan mondial.

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
magnetotransport	1044	19	13	1.25	2	10.53
magnetoimpedance	279	6	7	2.51	2	33.33
magnetic domain walls	737	18	5	0.68	2	11.11
magnetic nanostructures	2314	37	27	1.17	3	8.11
spin transport	4353	41	28	0.64	4	9.76
spin valve	647	21	12	1.85	2	9.52
amorphous magnetic materials	629	14	17	2.70	3	21.43
nanostructured magnetic materials	603	22	6	1.00	0	0.00
nanocrystalline magnetic materials	465	14	10	2.15	1	7.14

amorphous wires	372	9	18	4.84	3	33.33
magnetic nanowires	1913	28	22	1.15	3	10.71
magnetic wires	1641	21	37	2.25	4	19.05
magnetic domain effects	686	17	9	1.31	2	11.76
magnetization curves	1019	16	26	2.55	1	6.25
magnetic hysteresis	3574	23	69	1.93	3	13.04
magnetization dynamics	1409	25	16	1.14	4	16.00
magnetostriction	1080	13	21	1.94	3	23.08
ferromagnetic resonance	1558	20	10	0.64	4	20.00
nanoscale materials	1626	38	5	0.31	1	2.63
magnetic device	4465	38	31	0.69	2	5.26
magnetic sensors	2256	29	39	1.73	4	13.79
biomagnetic sensor	17	2	0	0.00	0	0.00



Recomandari:

Având în vedere perspectivele de utilizare deosebit de favorabile pe care materialele magnetice le au în domenii precum tehnologia informațiilor şi comunicațiile, industria automobilistică, medicină, energie, bioinginerie şi alte domenii conexe, se recomandă ca în următorii 10-15 ani să fie dezvoltate în România cercetările din acest domeniu. Această recomandare are la bază şi faptul că acest domeniu constituie o preocupare de vârf la nivel

mondial, demonstrat de numărul semnificativ de articole ISI publicate (peste 40.000 doar în perioada 2008-2011), precum şi avantajul major reprezentat de un transfer relativ rapid al rezultatelor preconizate în domeniile de aplicație amintite.

Este recomandată cu predilecție dezvoltarea activităților de cercetare în cele cinci subiecte selectate, subiecte reprezentative pentru amploarea temei, şi care acoperă întreaga gamă de cercetări începând cu materialele (subiectele 3.1 şi 3.4), continuând cu proprietățile şi fenomenele de interes (subiectele 3.2 şi 3.5), şi terminând cu cele mai semnificative aplicații pentru domeniile de utilizare vizate, respectiv senzorii şi actuatorii magnetici, inclusiv cei biomedicali (subiectul 3.3). Subiectele sunt echilibrate şi sunt sugestive atât pentru ariile în care există o expertiză valoroasă în ară, dovedită prin existența unor grupuri în România în care activitățile cercetătorilor sunt la acelaşi nivel cu grupurile din lume cu interese ştiințifice similare şi mai ales prin ponderea importantă (20-35%) a indicelui Hirsch al articolelor ştiințifice publicate de autori români în indicele Hirsch al articolelor publicate pe plan mondial în perioada 2008-2011 (de exemplu: materiale magnetice amorfe, aplicații ale materialelor magnetice în senzori, fire magnetice, materiale magnetostrictive, tehnici noi de investigare bazate pe fenomene de rezonanță magnetică), cât şi pentru ariile emergente, cu grad ridicat de noutate, în care este de aşteptat o explozie a preocupărilor şi rezultatelor semnificative abia în următorii 5-10 ani (de exemplu: senzori biomagnetici cu aplicații în magneto-cardiografie, implanturi biomedicale).

1. M. Andruh, D. G. Branzea, R. Gheorghe and A. M. Madalan, Crystengcomm **11** (12), 2571-2584 (2009).
2. M. Andruh, J. P. Costes, C. Diaz and S. Gao, Inorganic Chemistry **48** (8), 3342-3359 (2009).
3. M. V. Angelusiu, G. L. Almajan, T. Rosu, M. Negoiu, E. R. Almajan and J. Roy, European Journal of Medicinal Chemistry **44** (8), 3323-3329 (2009).
4. M. V. Avdeev, D. Bica, L. Vekas, V. L. Aksenov, A. V. Feoktystov, O. Marinica, L. Rosta, V. M. Garamus and R. Willumeit, Journal of Colloid and Interface Science **334** (1), 37-41 (2009).
5. M. Badea, R. Olar, D. Marinescu and G. Vasile, Journal of Thermal Analysis and Calorimetry **92** (1), 205-208 (2008).
6. I. Bica and H. J. Choi, International Journal of Modern Physics B **22** (29), 5041-5064 (2008).
7. A. S. Biris, T. C. Schmitt, R. B. Little, Z. Li, Y. Xu, A. R. Biris, D. Lupu, E. Dervishi, S. Trigwell, D. W. Miller and Z. Rahman, Journal of Physical Chemistry C **111** (48), 17970-17975 (2007).
8. D. G. Branzea, A. Guerri, O. Fabelo, C. Ruiz-Perez, L. M. Chamoreau, C. Sangregorio, A. Caneschi and M. Andruh, Crystal Growth & Design **8** (3), 941-949 (2008).
9. D. G. Branzea, L. Sorace, C. Maxim, M. Andruh and A. Caneschi, Inorganic Chemistry **47** (15), 6590-6592 (2008).
10. O. Caltun, I. Dumitru, M. Feder, N. Lupu and H. Chiriac, Journal of Magnetism and Magnetic Materials **320** (20), E869-E873 (2008).
11. D. Chicea and M. Racucliu, Journal of Optoelectronics and Advanced Materials **9** (12), 3843-3846 (2007).

12. H. Chiriac, T. A. Ovari, S. Corodeanu and G. Ababei, Physical Review B **76** (21) (2007).
13. B. Ciobanu and I. Radinschi, Romanian Journal of Physics **53** (1-2), 405-415 (2008).
14. O. Crisan, K. von Haeften, A. M. Ellis and C. Binns, Journal of Nanoparticle Research **10**, 193-199 (2008).
15. M. M. Dirtu, A. Rotaru, D. Gillard, J. Linares, E. Codjovi, B. Tinant and Y. Garcia, Inorganic Chemistry **48** (16), 7838-7852 (2009).
16. C. D. Ene, C. Maxim, F. Tuna and M. Andruh, Inorganica Chimica Acta **362** (5), 1660-1664 (2009).
17. C. D. Ene, F. Tuna, O. Fabelo, C. Ruiz-Perez, A. M. Madalan, H. W. Roesky and M. Andruh, Polyhedron **27** (2), 574-582 (2008).
18. R. Ferrando, G. Rossi, F. Nita, G. Barcaro and A. Fortunelli, Acs Nano **2** (9), 1849-1856 (2008).
19. S. Georgescu, O. Toma, A. M. Chinie, L. Gheorghe, A. Achim and A. S. Stefan, Journal of Luminescence **128** (5-6), 741-743 (2008).
20. S. Georgescu, O. Toma, A. M. Chinie, L. Gheorghe, A. Achim and A. S. Stefan, Optical Materials **30** (6), 1007-1012 (2008).
21. M. Gjoka, D. Niarchos, K. Giannakopoulos, C. Sarafidis, O. Kalogirou, M. Grigoras, N. Lupu and H. Chiriac, Materials Science and Engineering B-Advanced Functional Solid-State Materials **152** (1-3), 81-85 (2008).
22. A. Ianculescu, L. Mitoseriu, H. Chiriac, M. M. Carnasciali, A. Braileanu and R. Trusca, Journal of Optoelectronics and Advanced Materials **10** (7), 1805-1809 (2008).
23. A. R. Iordan, M. Airimioaiei, M. N. Palamaru, C. Galassi, A. V. Sandu, C. E. Ciomaga, F. Prihor, L. Mitoseriu and A. Ianculescu, Journal of the European Ceramic Society **29** (13), 2807-2813 (2009).
24. B. Jurca, J. Berthon, N. Dragoe and P. Berthet, Journal of Alloys and Compounds **474** (1-2), 416-423 (2009).
25. M. I. Katsnelson, V. Y. Irkhin, L. Chioncel, A. I. Lichtenstein and R. A. de Groot, Reviews of Modern Physics **80** (2), 315-378 (2008).
26. S. Khanra, K. Kuepper, T. Weyhermuller, M. Prinz, M. Raekers, S. Voget, A. V. Postnikov, F. M. F. de Groot, S. J. George, M. Coldea, M. Neumann and P. Chaudhuri, Inorganic Chemistry **47** (11), 4605-4617 (2008).
27. A. M. Madalan, N. Avarvari, M. Fourmigue, R. Clerac, L. F. Chibotaru, S. Clima and M. Andruh, Inorganic Chemistry **47** (3), 940-950 (2008).
28. A. M. Madalan, K. Bernot, F. Pointillart, M. Andruh and A. Caneschi, European Journal of Inorganic Chemistry (35), 5533-5540 (2007).
29. A. M. Madalan, E. Canadell, P. Auban-Senzier, D. Branzea, N. Avarvari and M. Andruh, New Journal of Chemistry **32** (2), 333-339 (2008).
30. A. Marcu, T. Yanagida, K. Nagashima, K. Oka, H. Tanaka and T. Kawai, Applied Physics Letters **92** (17) (2008).
31. G. Marin, M. Andruh, A. M. Madalan, A. J. Blake, C. Wilson, N. R. Champness and M. Schroder, Crystal Growth & Design **8** (3), 964-975 (2008).
32. C. Maxim, T. D. Pasatoiu, V. C. Kravtsov, S. Shova, C. A. Muryn, R. E. P. Winpenny, F. Tuna and M. Andruh, Inorganica Chimica Acta **361** (14-15), 3903-3911 (2008).
33. V. Moldoveanu, A. Manolescu and V. Gudmundsson, New Journal of Physics **11** (2009).
34. S. Nastase, C. Maxim, F. Tuna, C. Duhayon, J. P. Sutter and M. Andruh, Polyhedron **28** (9-10), 1688-1693 (2009).
35. F. Neatu, A. Kraynov, L. D'Souza, V. I. Parvulescu, K. Kranjc, M. Kocevar, V.

Kuncser and R. Richards, Applied Catalysis a-General **346** (1-2), 28-35 (2008).
36. S. V. Nistor and M. Stefan, Journal of Physics-Condensed Matter **21** (14) (2009).
37. P. Papaphilippou, L. Loizou, N. C. Popa, A. Han, L. Vekas, A. Odysseos and T. Krasia-Christoforou, Biomacromolecules **10** (9), 2662-2671 (2009).
38. P. Pascuta, G. Borodi and E. Culea, Journal of Non-Crystalline Solids **354** (52-54), 5475-5479 (2008).
39. M. R. Philpott, F. Cimpoesu and Y. Kawazoe, Chemical Physics **354** (1-3), 1-15 (2008).
40. J. C. Pivin, G. Socol, I. Mihailescu, P. Berthet, F. Singh, M. K. Patel and L. Vincent, Thin Solid Films **517** (2), 916-922 (2008).
41. V. G. Pol, J. M. Calderon-Moreno and P. Thiyagarajan, Industrial & Engineering Chemistry Research **48** (12), 5691-5695 (2009).
42. S. Rada, P. Pascuta, M. Bosca, M. Culea, L. Pop and E. Culea, Vibrational Spectroscopy **48** (2), 255-258 (2008).
43. N. Rezlescu, C. Doroftei, E. Rezlescu and P. D. Popa, Journal of Alloys and Compounds **451** (1-2), 492-496 (2008).
44. M. Sorescu, L. Diamandescu, A. Tomescu, D. Tarabasanu-Mihaila and V. Teodorescu, Materials Chemistry and Physics **107** (1), 127-131 (2008).
45. C. Tiseanu, M. U. Kumke, V. Parvulescu, A. Gessner, B. Gagea and J. Martens, Journal of Physical Chemistry B **112** (34), 10552-10562 (2008).
46. V. Tudor, G. Marin, F. Lloret, V. C. Kravtsov, Y. A. Simonov, M. Julve and M. Andruh, Inorganica Chimica Acta **361** (12-13), 3446-3452 (2008).
47. L. Vekas, D. Bica and M. V. Avdeev, China Particuology **5** (1-2), 43-49 (2007).
48. D. Visinescu, A. M. Madalan, M. Andruh, C. Duhayon, J. P. Sutter, L. Ungur, W. Van den Heuvel and L. F. Chibotaru, Chemistry-a European Journal **15** (44), 11808-11814 (2009).
49. D. Visinescu, L. M. Toma, F. Lloret, O. Fabelo, C. Ruiz-Perez and M. Julve, Dalton Transactions (1), 37-40 (2009).
50. K. Yamamoto, H. Yamaoka, N. Tsujii, A. M. Vlaicu, H. Oohashi, S. Sakakura, T. Tochio, Y. Ito, A. Chainani and S. Shin, Journal of the Physical Society of Japan **76** (12) (2007).

Tema 4: Suprafete micro sau nano structurate de largi dimensiuni

Subiectul 4.1: Dezvoltare de tehnologii laser de mare precizie pentru prelucrarea/texturarea suprafetelor cu topologii complexe (non-planare)
Subiectul 4.2: Interactii de suprafata, activarea laser a suprafetelor
Subiectul 4.3: Procese fundamentale de interactie laser cu suprafete si interfete. Metode computationale de analiza a interactiei laser cu materia
Subiectul 4.4: Nanoprocesare de filme subtiri si interfete
Subiectul 4.5: Tehnici standard de prelucrare de materiale cu laser (tratamente termice, decupaje, separare, asamblare de materiale nesimilare, curatare laser, dopaj laser, aplicatii in conservare etc). Dezvoltare de noi procese de productie.
Subiectul 4.6: Suport: Tehnologii de monitorizare si diagnostic, Tehnologii de control de fascicol, Tehnologii laser, metrologie, Tehnici de observatie si caracterizare de suprafete

Context: Realizari recente si perspective (la nivel international) :

Aria de aplicatie a laserilor de putere in domeniul procesarilor de materiale cunoaste astazi o dezvoltare remarcabila, iar evolutia este dictata de aparitia unor tehnici de inalta precizie, flexibilitate si randament atit pe scala macro, cit mai ales in micro si nanotehnologii. O tendinta accelerata de integrare a sistemelor laser in procese industriale de mare precizie poate fi de asemenea identificata, cu o prima arie de aplicatii legate de prelucrarea si ingineria suprafetelor pentru modificarea caracteristicilor mecanice, optice, tactile. Obiectivele sint strins legate de posibilitatea de a structura suprafete intr-un mod precis, pe zone de dimensiuni largi si intr-un mod efficient, compatibil cu un proces industrial. Aplicatiile se regasesc in domenii industriale esentiale implicind: transport, aplicatii mecanice (tribologie), cataliza, sanatate si energii alternative. Tendintele prezente se indreapta catre sisteme laser robuste, cu cadente inalte, in pulsuri scurte si ultrascurte, ce ofera in mod suplimentar posibilitatea multiplexarii fascicolului si interactii optimale. Aceste sisteme necesita evaluari de process in timp real si deci instalatii de observatie si control al lantului technologic cit si un efort de intelegere de proces. La nivel international se constata o conexiune importanta intre unitati de cercetare, de educatie superioara si unitati economice in structuri parteneriale cu interese si activitati comune, cu exemple de succes in Germania (Laser Zentrum Hannover, Bayerische Laser Zentrum, IFSW Stuttgart, etc), Franta (noile structuri de excelenta Equipex/Labex), Irlanda (National University of Ireland Laser center/Lighthouse) etc. O gama larga de actori industriali este implicata, vizand in special companii din industria mecanica, automobile, aviatie marcaj/securitate, etc.

Contributie romaneasca (recenta) si obiective propuse (viitor):

Domeniul ablatiei laser este un domeniu principal de cercetare in laboratoare romanesti, cu note specifice in procesarea de suprafete. Analiza WOS indica o expertiza consistenta atit in numar de publicatii (3-8%) cit si in factor h (10-30%). Legat de potentialul cercetarii in domeniu in laboratoare romanesti se poate remarca potentialul unui efect de structurare orizontala prin cooperari nationale ce implica industria de profil (auto, mecanica, tribologie, microelectronica, industria energetica) si universitatile tehnice.

Analiza WOS (perioada 2008-2011).

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
Laser ablation	6953	33	216	3%	8	24%
Laser structuring	303	10	10	3%	3	33%
Laser processing	4875	32	58	1%	3	10%
Ultrafast OR femtosecond laser ablation	1150	16	18	2%	4	25%
Laser surface interaction	1126	19	19	2%	2	10%
Laser surface structuring/processing	1371	19	19	1%	2	10%
Laser surface activation	329	13	2	0.6%	1	8%
Laser film processing	418	12	7	2%	2	30%
Laser treatment	9589	36	72	2%	4	11%
Laser assembling	135	9	3	2%	1	10%
Laser surface nanostructuring, nanopatterning, periodic patterns	170	11	3	2%	1	10%

Concluzii: Procesarea de materiale prin ablatie laser ramine un domeniu international de activitate sustinuta ce a atins deja o maturitate stiintifica, la pragul aplicatiilor industriale. Procesarea suprafetelor este in mod cert un domeniu in care implicatiile industriale ale tehnologiilor laser indica un cimp de oportunitati remarcabil. Cercetarea romaneasca joaca deja un rol vizibil in competitia internationala cu un potential semnificativ de a mari aceasta pondere atit prin activitati proprii de cercetare cit, mai ales, prin parteneriate stiintifice si economice. Rezultatele obtinute recent vizeaza in mod dominant fenomenul general al ablatiei laser, cu o componenta astazi mai modesta in domeniul direct al procesarii de suprafete. Noua infrastructura laser existenta in principal pe platforma Magurele si expertiza existenta in institutiile tehnice de educatie creaza premize foarte bune pentru relansarea unei activitati competitive in domeniu. Este recomandata sprijinirea dezvoltarii infrastructurii laser si favorizarea caracterului interdisciplinar si al interactiei cu potentiali beneficiari de aplicatii laser. Aceasta interactie poate contribui la maturizarea tehnicilor propuse, catre o implementare industriala directa.

Publicatii relevante (2008-2011)

1. Title: Biosensing with plasmonic nanosensors Author(s): Anker JN, Hall WP, Lyandres O, et al., Source: NATURE MATERIALS Volume: 7 Issue: 6 Pages: 442-453 Published: JUN 2008 citations 420

2. Title: Polymer microfabrication technologies for microfluidic systems Author(s): Becker H, Gartner C Source: ANALYTICAL AND BIOANALYTICAL CHEMISTRY Volume: 390 Issue: 1 Pages: 89-111 Published: JAN 2008 citations 118

3. Title: Novel optical properties and emerging applications of metal nanostructures Author(s): Schwartzberg AM, Zhang JZ Source: JOURNAL OF PHYSICAL CHEMISTRY C Volume: 112 Issue: 28 Pages: 10323-10337 Published: JUL 17 2008 citations 55

4. Title: Colorizing metals with femtosecond laser pulses Author(s): Vorobyev AY, Guoa CL Source: APPLIED PHYSICS LETTERS Volume: 92 Issue: 4 Article Number: 041914 Published: JAN 28 2008 citations 35

5. Title: Subwavelength direct-write nanopatterning using optically trapped microspheres Author(s): McLeod E, Arnold CB Source: NATURE NANOTECHNOLOGY Volume: 3 Issue: 7 Pages: 413-417 Published: JUL 2008 citations 37

6. Title: Progress in nanoengineered microstructures for tunable high-current, high-temperature superconducting wires Author(s): Holesinger TG, Civale L, Maiorov B, et al. Source: ADVANCED MATERIALS Volume: 20 Issue: 3 Pages: 391-407 Published: FEB 4 2008 citations 30

7. Title: Origin of periodicity in nanostructuring on thin film surfaces ablated with femtosecond laser pulses Author(s): Miyaji G, Miyazaki K Source: OPTICS EXPRESS Volume: 16 Issue: 20 Pages: 16265-16271 Published: SEP 29 2008 citations 24

8. Title: Femtosecond Laser-Nanostructured Substrates for Surface-Enhanced Raman Scattering Author(s): Diebold ED, Mack NH, Doom SK, et al. Source: LANGMUIR Volume: 25 Issue: 3 Pages: 1790-1794 Published: FEB 3 2009 citations 19

9. Title: Nanostructuring of thin gold films by femtosecond lasers Author(s): Kuznetsov AI, Koch J, Chichkov BN ource: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 94 Issue: 2 Pages: 221-230 Published: FEB 2009 citations 17

10. Title: Structuring electrospun polycaprolactone nanofiber tissue scaffolds by femtosecond laser ablation Author(s): Choi HW, Johnson JK, Nam J, et al. Source: JOURNAL OF LASER APPLICATIONS Volume: 19 Issue: 4 Pages: 225-231 Published: NOV 2007 citations 12

11. Title: Tailoring the wetting response of silicon surfaces via fs laser structuring Author(s): Zorba V, Stratakis E, Barberoglou M, et al. Source: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 93 Issue: 4 Pages: 819-825 Published: DEC 2008 citations 11

12. Title: Bio-inspired water repellent surfaces produced by ultrafast laser structuring of silicon Author(s): Barberoglou M, Zorba V, Stratakis E, et al. Source: APPLIED SURFACE SCIENCE Volume: 255 Issue: 10 Pages: 5425-5429 Published: MAR 1 2009 citations 10

13. Title: Friction characteristics of submicrometre-structured surfaces fabricated by particle-assisted near-field enhancement with femtosecond laser Author(s): Sakai T, Nedyalkov N, Obara M Source: JOURNAL OF PHYSICS D-APPLIED PHYSICS Volume: 40 Issue: 23 Pages: 7485-7491 Published: DEC 7 2007 citations 10

14. Title: High throughput diffractive multi-beam femtosecond laser processing using a spatial light modulator Author(s): Kuang Z, Perrie W, Leach J, et al. Source: APPLIED SURFACE SCIENCE Volume: 255 Issue: 5 Pages: 2284-2289 Part: Part 1 Published: DEC 30 2008 citations 9

15. Title: Suppression of ripples on ablated Ni surface via a polarization grating Author(s): Iwase H, Kokubo S, Juodkazis S, et al. Source: OPTICS EXPRESS Volume: 17 Issue: 6 Pages: 4388-4396 Published: MAR 16 2009 citations 9

16. Title: Advanced design of periodical architectures in bulk metals by means of Laser Interference Metallurgy Author(s): Lasagni A, D'Alessandria M, Giovanelli R, et al. Conference Information: Symposium on Laser Synthesis and Processing of Advanced Materials held at the E-MRS 2007 Spring Meeting, 2007 Strasbourg, FRANCE Source: APPLIED SURFACE SCIENCE Volume: 254 Issue: 4 Pages: 930-936 Published: DEC 15 2007 citations 9

17. Title: Surface nanoprocessing with nondiffracting femtosecond Bessel beams Author(s): Courvoisier F, Lacourt PA, Jacquot M, et al. Source: OPTICS LETTERS Volume: 34 Issue: 20 Pages: 3163-3165 Published: OCT 15 2009 citations 7

18. Title: Study of the Micro- and Nanostructured Silicon for Biosensing and Medical Applications Author(s): Kleps I, Miu M, Simion M, et al. Source: JOURNAL OF BIOMEDICAL NANOTECHNOLOGY Volume: 5 Issue: 3 Pages: 300-309 Published: JUN 2009 citations 5

Articole cu participare romaneasca 2008-2011

1. Title: Structuring electrospun polycaprolactone nanofiber tissue scaffolds by femtosecond laser ablation Author(s): Choi HW, Johnson JK, Nam J, et al., Source: JOURNAL OF LASER APPLICATIONS Volume: 19 Issue: 4 Pages: 225-231 Published: NOV 2007 citations 12

2. Title: The potential of UV femtosecond laser ablation for varnish removal in the restoration of painted works of art Author(s): Pouli P, Paun IA, Bounos G, et al., Source:

APPLIED SURFACE SCIENCE Volume: 254 Issue: 21 Pages: 6875-6879 Published: AUG 30 2008 citations 8

3. Title: Photochromic properties of polyimide and polysiloxane azopolymers Author(s): Sava I, Sacarescu L, Stoica I, et al. Source: POLYMER INTERNATIONAL Volume: 58 Issue: 2 Pages: 163-170 Published: FEB 2009 citations 6

4. Title: Femtosecond Laser Induced Periodic Surface Structures on ZnO Thin Films Author(s): Zamfirescu M, Ulmeanu M, Jipa F, et al. Source: JOURNAL OF LASER MICRO NANOENGINEERING Volume: 4 Issue: 1 Pages: 7-10 Published: APR 2009 citations 4

5. Title: LASER PROCESSING AND CHARACTERIZATION WITH FEMTOSECOND LASER PULSES Author(s): Zamfirescu M, Ulmeanu M, Jipa F, et al. Source: ROMANIAN REPORTS IN PHYSICS Volume: 62 Issue: 3 Special Issue: Sp. Iss. SI Pages: 594-609 Published: 2010 citations 1

6. Title: Optimisation of processing with excimer laser mask technique Author(s): Sava V, Ilie C, Popa M, et al. Source: OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS Volume: 5 Issue: 1-2 Pages: 99-102 Published: JAN 2011 citations 0.

7. Title: Structuring by field enhancement of glass, Ag, Au, and Co thin films using short pulse laser ablation Author(s): Ulmeanu M, Zamfirescu M, Rusen L, et al. Source: JOURNAL OF APPLIED PHYSICS Volume: 106 Issue: 11 Article Number: 114908 Published: DEC 1 2009 citations 0

8. Title: Laser cleaning of paintings: From preliminary investigations to a laser cleaning station Author(s): Apostol I, Damian V, Garoi F, et al. Conference Information: Conference on Advanced Topics in Optoelectronics, Microelectronics, and Nanotechnologies V, AUG 26-29, 2010 Constanta, ROMANIA Source: ADVANCED TOPICS IN OPTOELECTRONICS, MICROELECTRONICS, AND NANOTECHNOLOGIES V Book Series: Proceedings of SPIE-The International Society for Optical Engineering Volume: 7821 Pages: - Published: 2010 citations 0

9. Title: Interferometric patterning of the azo-polymers surface Author(s): Damian V, Apostol I, Hurduc N Source: JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 12 Issue: 1 Pages: 146-151 Published: JAN 2010 citations 0

10. Title: Nano and micro-morphology modifications of Si (100) substrate induced by femtosecond laser pulse irradiations in air, water, CCl4 and C2Cl3F3 Author(s): Ionel L, Cristescu CP, Jipa F, et al. Source: OPTOELECTRONICS AND ADVANCED MATERIALS-RAPID COMMUNICATIONS Volume: 4 Issue: 11 Pages: 1920-1924 Published: NOV 2010 citations 0

11. Title: HYDROPHILIC SURFACE PATTERNING OF POLYAMIDE TEXTILE MATERIALS, USING EXCIMER UV LASER TREATMENT Author(s): Vrinceanu N, Coman D, Grigoriu A, et al. Conference Information: 4th International Textile Clothing and Design Conference, OCT 05-08, 2008 Dubrovnik, CROATIA Source: ITC&DC: 4TH INTERNATIONAL TEXTILE CLOTHING & DESIGN CONFERENCE, BOOK

OF PROCEEDINGS - MAGIC WORLD OF TEXTILES Pages: 482-486 Published: 2008 00000

Alte publicatii de interes 2000-2011

1. Title: Sub-diffraction limited structuring of solid targets with femtosecond laser pulses Author(s): Korte F, Adams S, Egbert A, et al. Source: OPTICS EXPRESS Volume: 7 Issue: 2 Pages: 41-49 Published: JUL 17 2000 citations 71

2. Title: Local held enhancement effects for nanostructuring of surfaces Author(s): Munzer HJ, Mosbacher M, Bertsch M, et al. Conference Information: 6th International Conference on Near-field Optics and Related Techniques, AUG 27-31, 2000 UNIV TWENTE, ENSCHEDE, NETHERLANDS Source: JOURNAL OF MICROSCOPY-OXFORD Volume: 202 Pages: 129-135 Part: Part 1 Published: APR 2001 citations 66

3. Title: Femtosecond laser aperturless near-field nanomachining of metals assisted by scanning probe microscopy Author(s): Chimmalgi A, Choi TY, Grigoropoulos CP, et al. Source: APPLIED PHYSICS LETTERS Volume: 82 Issue: 8 Pages: 1146-1148 Published: FEB 24 2003 citations 63

4. Title: Laser application of polymers Author(s): Lippert T Source: POLYMERS AND LIGHT Book Series: ADVANCES IN POLYMER SCIENCE Volume: 168 Pages: 51-246 Published: 2004 citations 52

5. Title: Miniature all-fiber devices based on CO2 laser micro structuring of tapered fibers Author(s): Kakarantzas G, Dimmick TE, Birks TA, et al. Source: OPTICS LETTERS Volume: 26 Issue: 15 Pages: 1137-1139 Published: AUG 1 2001 citations 52

6. Title: Fundamentals and advantages of ultrafast micro-structuring of transparent materials Author(s): Ashkenasi D, Muller G, Rosenfeld A, et al. Source: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 77 Issue: 2 Pages: 223-228 Published: JUL 2003 citations 51

7. Title: Surface micromachining of UV transparent materials Author(s): Kopitkovas G, Lippert T, David C, et al. Conference Information: EMRS 2003 Spring Conference, JUN 10-11, 2003 Strasbourg, FRANCE Source: THIN SOLID FILMS Volume: 453 Pages: 31-35 Published: APR 1 2004 citations 49

8. Title: Nanotexturing of gold films by femtosecond laser-induced melt dynamics Author(s): Koch J, Korte F, Bauer T, et al. Source: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 81 Issue: 2 Pages: 325-328 Published: JUL 2005 citations 45

9. Title: ENERGY COUPLING EFFICIENCY IN LASER-SURFACE TREATMENT Author(s): DAUSINGER F, SHEN JL Source: ISIJ INTERNATIONAL Volume: 33 Issue: 9 Pages: 925-933 Published: 1993 citations 32

Publicatii cu participare romaneasca 2000-2011

1. Title: Coulomb explosion in ultrashort pulsed laser ablation of Al2O3 Author(s): Stoian R, Ashkenasi D, Rosenfeld A, et al. Source: PHYSICAL REVIEW B Volume: 62 Issue: 19 Pages: 13167-13173 Published: NOV 15 2000 citations 130

2. Title: Surface charging and impulsive ion ejection during ultrashort pulsed laser ablation Author(s): Stoian R, Rosenfeld A, Ashkenasi D, et al. Source: PHYSICAL REVIEW LETTERS Volume: 88 Issue: 9 Article Number: 097603 Published: MAR 4 2002 citations 91

3. Title: Laser ablation of dielectrics with temporally shaped femtosecond pulses Author(s): Stoian R, Boyle M, Thoss A, et al. Source: APPLIED PHYSICS LETTERS Volume: 80 Issue: 3 Pages: 353-355 Published: JAN 21 2002 citations 87

4. Title: Comparison between ZnO films grown by femtosecond and nanosecond laser ablation Author(s): Perriere J, Millon E, Seiler W, et al. Source: JOURNAL OF APPLIED PHYSICS Volume: 91 Issue: 2 Pages: 690-696 Published: JAN 15 2002 citations 87

5. Title: Characteristics of the surface layer of barium strontium titanate thin films deposited by laser ablation Author(s): Craciun V, Singh RK Source: APPLIED PHYSICS LETTERS Volume: 76 Issue: 14 Pages: 1932-1934 Published: APR 3 2000 citations 82

6. Title: Electronic transport and consequences for material removal in ultrafast pulsed laser ablation of materials Author(s): Bulgakova NM, Stoian R, Rosenfeld A, et al. Source: PHYSICAL REVIEW B Volume: 69 Issue: 5 Article Number: 054102 Published: FEB 2004 citations 59

Tema 5: Transfer de materie asistat laser

Subiectul 5.1: Depuneri de straturi subtiri constituite din materiale complexe. Aplicatii in electronica (senzori, etc), bioaplicatii
Subiectul 5.2: Imprimare prin transfer de material
Subiectul 5.3: Metode de diagnostic, Metode numerice de modelare
Subiectul 5.6: Metode de analiza prin ablatie laser (MALDI, LIBS)
Subiectul 5.7: Suport: Tehnologii de monitorizare si diagnostic, Tehnologii de control de fascicol, Tehnologii laser, metrologie

Context: Realizari recente si perspective (la nivel international) :

Fabricarea de materiale noi, straturi subtiri functionale cu aplicatii in optica, microelectronica sau mecanica a cunoscut incepind din anii 80 o dezvoltare accelerata. Implicatiile sint multiple, de la crearea de straturi cu proprietati relevante in optica si aplicatii fotovoltaice pina la heterostructuri in electronica sau straturi cu caracteristici tribologice in domeniul mecanicii. Existenta unor programe europene in domeniu a permis dezvoltarea unor retele de cooperare in interiorul UE precum si un rol de conducere in domeniul R&D conex.

Contributie romaneasca (recenta) si obiective propuse (viitor):

In mod evident, acest domeniu este cel mai bine reprezentat in cercetarea romaneasca in cimpul de aplicatii laser. Zona de interes acopera diverse arii; de la generarea de materiale compozite noi, plasmonica, pina la bio-aplicatii. Infrastructura existenta este adecvata pentru o activitate performanta, bine incadrata in noile tendinte de cercetare la nivel international si asistata de un sistem de colaborari internationale solide si participari la programe internationale.

Analiza WOS (perioada 2008-2011).

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
Pulsed laser deposition	5096	29	179	3.5%	7	25%
Laser material transfer	1210	20	19	1.5%	4	20%
Laser assembling	135	9	3	2%	1	10%
Laser nanoparticles	4158	37	67	1.5%	4	11%
Analitical laser methods LIBS, MALDI	7038	36	15	0.2%	3	8%

Concluzii: Activitatea locala de cercetare este bine integrata in actualele tendinte atit gratie unei infrastructuri de cercetare de calitate cit si unei serii de colaborari internationale de

success. Diverse grupuri sint implicate in domeniu si, cu o buna coordonare, potentialul existent poate fi dezvoltat in continuare.

Publicatii relevante (2008-2011)

1. Title: TiO2 photocatalysis and related surface phenomena Author(s): Fujishima A, Zhang XT, Tryk DA Source: SURFACE SCIENCE REPORTS Volume: 63 Issue: 12 Pages: 515-582 Published: DEC 15 2008 citations 308

2. Title: p-Type semiconducting nickel oxide as an efficiency-enhancing anode interfacial layer in polymer bulk-heterojunction solar cells Author(s): Irwin MD, Buchholz B, Hains AW, et al.Source: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA Volume: 105 Issue: 8 Pages: 2783-2787 Published: FEB 26 2008 citations 158

3. Title: Laser ablation in liquids: Applications in the synthesis of nanocrystals Author(s): Yang GW Source: PROGRESS IN MATERIALS SCIENCE Volume: 52 Issue: 4 Pages: 648-698 Published: MAY 2007 citations 119

4. Title: Laser ablation electrospray ionization for atmospheric pressure, in vivo, and imaging mass spectrometry Author(s): Nemes P, Vertes A Source: ANALYTICAL CHEMISTRY Volume: 79 Issue: 21 Pages: 8098-8106 Published: NOV 1 2007 citations 112

5. Title: Precision proteomics: The case for high resolution and high mass accuracy Author(s): Mann M, Kelleher NL Source: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA Volume: 105 Issue: 47 Pages: 18132-18138 Published: NOV 25 2008 citations 89

6. Title: Growth of nanowires Author(s): Wang N, Cai Y, Zhang RQ Source: MATERIALS SCIENCE & ENGINEERING R-REPORTS Volume: 60 Issue: 1-6 Pages: 1-51 Published: MAR 31 2008 citations 78

7. Title: Plasmonic photothermal therapy (PPTT) using gold nanoparticles Author(s): Huang XH, Jain PK, El-Sayed IH, et al.Source: LASERS IN MEDICAL SCIENCE Volume: 23 Issue: 3 Pages: 217-228 Published: JUL 2008 citations 78

8. Title: Enhanced precision, accuracy, efficiency, and spatial resolution of U-Pb ages by laser ablation-multicollector-inductively coupled plasma-mass spectrometry, Author(s): Gehrels GE, Valencia VA, Ruiz J, Source: GEOCHEMISTRY GEOPHYSICS GEOSYSTEMS Volume: 9 Article Number: Q03017 Published: MAR 20 2008 citations 60

9. Title: Nanoparticle MALDI-TOF mass spectrometry without fragmentation: Au-25(SCH2CH2Ph)(18) and mixed monolayer Au-25(SCH2CH2Ph)(18-x)(L)(x) Author(s): Dass A, Stevenson A, Dubay GR, et al. Source: JOURNAL OF THE AMERICAN CHEMICAL SOCIETY Volume: 130 Issue: 18 Pages: 5940-5946 Published: MAY 7 2008 citations 52

10. Title: Perspective on the Development of Lead-free Piezoceramics Author(s): Rodel J, Jo W, Seifert KTP, et al. Source: JOURNAL OF THE AMERICAN CERAMIC SOCIETY Volume: 92 Issue: 6 Pages: 1153-1177 Published: JUN 2009 03401659Title: Ambient molecular imaging and depth profiling of live tissue by infrared laser ablation

electrospray ionization mass spectrometry Author(s): Nemes P, Barton AA, Li Y, et al. Source: ANALYTICAL CHEMISTRY Volume: 80 Issue: 12 Pages: 4575-4582 Published: JUN 15 2008 citations 47

11. Title: Strategies for residue explosives detection using laser-induced breakdown spectroscopy Author(s): Gottfried JL, De Lucia FC, Munson CA, et al. Source: JOURNAL OF ANALYTICAL ATOMIC SPECTROMETRY Volume: 23 Issue: 2 Pages: 205-216 Published: 2008 citations 39

12. Title: Double-pulse standoff laser-induced breakdown spectroscopy for versatile hazardous materials detection Author(s): Gottfried JL, De Lucia FC, Munson CA, et al. Conference Information: 4th International Conference on Laser-Induced Breakdown Spectroscopy (LIBS 2006), SEP 04-08, 2006 Montreal, CANADA Source: SPECTROCHIMICA ACTA PART B-ATOMIC SPECTROSCOPY Volume: 62 Issue: 12 Special Issue: Sp. Iss. SI Pages: 1405-1411 Published: DEC 2007 citations 33

13. Title: Characterization of laser induced plasmas by optical emission spectroscopy: A review of experiments and methods Author(s): Aragon C, Aguilera JA Source: SPECTROCHIMICA ACTA PART B-ATOMIC SPECTROSCOPY Volume: 63 Issue: 9 Pages: 893-916 Published: SEP 2008 citations 30

14. Title: Experimental and theoretical comparison of single-pulse and double-pulse laser induced breakdown spectroscopy on metallic samples Author(s): De Giacomo A, Dell'Aglio M, Bruno D, et al. Source: SPECTROCHIMICA ACTA PART B-ATOMIC SPECTROSCOPY Volume: 63 Issue: 7 Pages: 805-816 Published: JUL 2008 citations 26

15. Title: Towards quantitative laser-induced breakdown spectroscopy analysis of soil samples Author(s): Bousquet B, Sirven JB, Canioni L Conference Information: 4th International Conference on Laser-Induced Breakdown Spectroscopy (LIBS 2006), SEP 04-08, 2006 Montreal, CANADA Source: SPECTROCHIMICA ACTA PART B-ATOMIC SPECTROSCOPY Volume: 62 Issue: 12 Special Issue: Sp. Iss. SI Pages: 1582-1589 Published: DEC 2007 citations 25

16. Title: Light as a construction tool of metal nanoparticles: Synthesis and mechanism Author(s): Sakamoto M, Fujistuka M, Majima T Source: JOURNAL OF PHOTOCHEMISTRY AND PHOTOBIOLOGY C-PHOTOCHEMISTRY REVIEWS Volume: 10 Issue: 1 Pages: 33-56 Published: MAR 2009 citations 24

17. Title: Jet formation in the laser forward transfer of liquids Author(s): Duocastella M, Fernandez-Pradas JM, Serra P, et al. Source: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 93 Issue: 2 Pages: 453-456 Published: NOV 2008 citations 18

18. Title: Correlation between ablation efficiency and nanoparticle generation during the short-pulse laser ablation of metals Author(s): Hermann J, Noel S, Itina TE, et al. Source: LASER PHYSICS Volume: 18 Issue: 4 Pages: 374-379 Published: APR 2008 citations 17

19. Title: Synthesis of Size-Tunable Polymer-Protected Gold Nanoparticles by Femtosecond Laser-Based Ablation and Seed Growth Author(s): Besner S, Kabashin AV, Winnik FM,

et al. Source: JOURNAL OF PHYSICAL CHEMISTRY C Volume: 113 Issue: 22 Pages: 9526-9531 Published: JUN 4 2009 citations 15

20. Title: Process modeling in laser deposition of multilayer SS410 steel Author(s): Wang L, Felicelli S Source: JOURNAL OF MANUFACTURING SCIENCE AND ENGINEERING-TRANSACTIONS OF THE ASME Volume: 129 Issue: 6 Pages: 1028-1034 Published: DEC 2007 citations 14

21. Title: Carbon Nanotubes: Synthesis, Properties, and Applications Author(s): Dervishi E, Li ZR, Xu Y, et al. Source: PARTICULATE SCIENCE AND TECHNOLOGY Volume: 27 Issue: 2 Pages: 107-125 Published: 2009 citations 9

22. Title: Titanium dioxide nanoparticles prepared by laser pyrolysis: Synthesis and photocatalytic properties Author(s): Figgemeier E, Kylberg W, Constable E, et al. Conference Information: Symposium on Laser Synthesis and Processing of Advanced Materials held at the E-MRS 2007 Spring Meeting, 2007 Strasbourg, FRANCE Source: APPLIED SURFACE SCIENCE Volume: 254 Issue: 4 Pages: 1037-1041 Published: DEC 15 2007 citations 5

23. Title: Nanodots induced columnar growth of YBa2Cu3Ox films Author(s): Mikheenko P, Tanner JL, Bowen J, et al. Conference Information: 9th International Conference on Materials and Mechanisms of Superconductivity, SEP 07-12, 2009 Tokyo, JAPAN Source: PHYSICA C-SUPERCONDUCTIVITY AND ITS APPLICATIONS Volume: 470 Special Issue: Sp. Iss. SI Suppl. 1 Pages: S234-S236 Supplement: Sp. Iss. SI Suppl. 1 Published: DEC 2010 citations 2

Articole cu participare romaneasca (2008-2011)

1. Title: Strontium-substituted hydroxyapatite coatings synthesized by pulsed-laser deposition: In vitro osteoblast and osteoclast response Author(s): Capuccini C, Torricelli P, Sima F, et al. Source: ACTA BIOMATERIALIA Volume: 4 Issue: 6 Pages: 1885-1893 Published: NOV 2008 citations 18

2. Title: Correlation between ablation efficiency and nanoparticle generation during the short-pulse laser ablation of metals Author(s): Hermann J, Noel S, Itina TE, et al. Source: LASER PHYSICS Volume: 18 Issue: 4 Pages: 374-379 Published: APR 2008 citations 17

3. Title: Experimental and theoretical investigations of a laser-produced aluminum plasma Author(s): Gurlui S, Agop M, Nica P, et al. Source: PHYSICAL REVIEW E Volume: 78 Issue: 2 Article Number: 026405 Part: Part 2 Published: AUG 2008 citations 16

4. Title: Enhancement of Oxide VLS Growth by Carbon on Substrate Surface Author(s): Yanagida T, Marcu A, Matsui H, et al. Source: JOURNAL OF PHYSICAL CHEMISTRY C Volume: 112 Issue: 48 Pages: 18923-18926 Published: DEC 4 2008 citations 15

5. Title: Synthesis and photochromic behavior of new polyimides containing azobenzene side groups Author(s): Sava I, Resmerita AM, Lisa G, et al. Source: POLYMER Volume: 49 Issue: 6 Pages: 1475-1482 Published: MAR 17 2008 citations 12

6. Title: Structural and electrical characterization of lead-free ferroelectric Na1/2Bi1/2TiO3-BaTiO3 thin films obtained by PLD and RF-PLD Author(s): Scarisoreanu N, Craciun F, Ion V, et al. Conference Information: Symposium on Laser Synthesis and Processing of Advanced Materials held at the E-MRS 2007 Spring Meeting, 2007 Strasbourg, FRANCE Source: APPLIED SURFACE SCIENCE Volume: 254 Issue: 4 Pages: 1292-1297 Published: DEC 15 2007 citations 12

7. Title: Patterning parameters for biomolecules microarrays constructed with nanosecond and femtosecond UV lasers Author(s): Dinca V, Farsari M, Kafetzopoulos D, et al. Source: THIN SOLID FILMS Volume: 516 Issue: 18 Pages: 6504-6511 Published: JUL 31 2008 citations 11

8. Title: Effects of deposition temperature on the structural and morphological properties of SnO2 films fabricated by pulsed laser deposition Author(s): Khandelwal R, Singh AP, Kapoor A, et al. Source: OPTICS AND LASER TECHNOLOGY Volume: 41 Issue: 1 Pages: 89-93 Published: FEB 2009 citations 11

9. Title: Thermal analysis and thin films deposition by matrix assisted pulsed laser evaporation of a 4CN type azomonoether Author(s): Rotaru A, Constantinescu C, Rotaru P, et al. Conference Information: 8th Mediterranean Conference on Calorimetry and Thermal Analysis, SEP 25-29, 2007 Palermo, ITALY Source: JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY Volume: 92 Issue: 1 Pages: 279-284 Published: APR 2008 citations 10

10. Title: Development of peptide-based patterns by laser transfer Author(s): Dinca V, Kasotakis E, Catherine J, et al. Conference Information: Symposium on Laser Synthesis and Processing of Advanced Materials held at the E-MRS 2007 Spring Meeting, 2007 Strasbourg, FRANCE Source: APPLIED SURFACE SCIENCE Volume: 254 Issue: 4 Pages: 1160-1163 Published: DEC 15 2007 citations 9

11. Title: Bridging biomolecules with nanoparticles: surface-enhanced Raman scattering from colon carcinoma and normal tissue Author(s): Pinzaru SC, Andronie LM, Domsa I, et al. Source: JOURNAL OF RAMAN SPECTROSCOPY Volume: 39 Issue: 3 Pages: 331-334 Published: MAR 2008 citations 9

12. Title: Quantification of the activity of biomolecules in microarrays obtained by direct laser transfer Author(s): Dinca V, Ranella A, Farsari M, et al. Source: BIOMEDICAL MICRODEVICES Volume: 10 Issue: 5 Pages: 719-725 Published: OCT 2008 citations 8

13. Title: Experimental and Theoretical Aspects of Aluminum Expanding Laser Plasma Author(s): Nica P, Vizureanu P, Agop M, et al. Source: JAPANESE JOURNAL OF APPLIED PHYSICS Volume: 48 Issue: 6 Article Number: 066001 Part: Part 1 Published: JUN 2009 citations 8

14. Title: Space- and time-resolved optical diagnosis for the study of laser ablation plasma dynamics Author(s): Ursu C, Gurlui S, Focsa C, et al. Conference Information: 4th Conference on Elementary Processes in Atomic Systems, JUN 18-20, 2008 Clu Napoca, ROMANIA Source: NUCLEAR INSTRUMENTS & METHODS IN PHYSICS

RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS Volume: 267 Issue: 2 Pages: 446-450 Published: JAN 2009 citations 7

15. Title: Pulsed electron beam deposition of oxide thin films Author(s): Nistor M, Mandache NB, Perriere J Source: JOURNAL OF PHYSICS D-APPLIED PHYSICS Volume: 41 Issue: 16 Article Number: 165205 Publish AUG 21 2008 citations 7

16. Title: Laser-Induced Forward Transfer: An Approach to Single-Step Polymer Microsensor Fabrication Author(s): Dinca V, Fardel R, Shaw-Stewart J, et al. Conference Information: Spring Meeting of the European-Materials-Research-Society, JUN 08-12, 2009 Strasbourg, FRANCE Source: SENSOR LETTERS Volume: 8 Issue: 3 Special Issue: Sp. Iss. SI Pages: 436-440 Published: JUN 2010 citations 4

17. Title: Parameters optimization for biological molecules patterning using 248-nm ultrafast lasers Author(s): Dinca V, Ranella A, Popescu A, et al. Conference Information: Symposium on Laser Synthesis and Processing of Advanced Materials held at the E-MRS 2007 Spring Meeting, 2007 Strasbourg, FRANCE Source: APPLIED SURFACE SCIENCE Volume: 254 Issue: 4 Pages: 1164-1168 Published: DEC 15 2007 citations 4

18. Title: Structures of metal nanoparticles adsorbed on MgO(001). II. Pt and Pd Author(s): Goniakowski J, Jelea A, Mottet C, et al. Source: JOURNAL OF CHEMICAL PHYSICS Volume: 130 Issue: 17 Article Number: 174703 Published: MAY 7 2009 citations 4

19. Title: Preparation and characterization of nitrogen-doped TiO2 nanoparticles by the laser pyrolysis of N2O-containing gas mixtures Author(s): Alexandrescu R, Scarisoreanu M, Morjan I, et al. Source: APPLIED SURFACE SCIENCE Volume: 255 Issue: 10 Pages: 5373-5377 Published: MAR 1 2009 citations 4

20. Title: Correlation between plasma expansion and damage threshold by femtosecond laser ablation of fused silica Author(s): Axente E, Noel S, Hermann J, et al. Source: JOURNAL OF PHYSICS D-APPLIED PHYSICS Volume: 41 Issue: 10 Article Number: 105216 Published: MAY 21 2008 citations 4

21. Title: Application of clean laser transfer for porphyrin micropatterning Author(s): Kononenko TV, Nagovitsyn IA, Chudinova GK, et al. Source: APPLIED SURFACE SCIENCE Volume: 256 Issue: 9 Pages: 2803-2808 Published: FEB 15 2010 citations 3

22. Title: Magnetic properties of core-shell catalyst nanoparticles for carbon nanotube growth Author(s): Fleaca CT, Morjan I, Alexandrescu R, et al. Source: APPLIED SURFACE SCIENCE Volume: 255 Issue: 10 Pages: 5386-5390 Published: MAR 1 2009 citations 3

23. Title: The study of Raman enhancement efficiency as function of nanoparticle size and shape Author(s): Boca SC, Farcau C, Astilean S Conference Information: 4th Conference on Elementary Processes in Atomic Systems, JUN 18-20, 2008 Clu Napoca, ROMANIA Source: NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS Volume: 267 Issue: 2 Pages: 406-410 Published: JAN 2009 citations 3

Alte publicatii de interes 2000-2011

1. Title: PLASMA DIAGNOSTICS IN PULSED-LASER TIN LAYER DEPOSITION Author(s): HERMANN J, THOMANN AL, BOULMERLEBORGNE C, et al. Source: JOURNAL OF APPLIED PHYSICS Volume: 77 Issue: 7 Pages: 2928-2936 Published: APR 1 1995 citations 72

2. Title: Human osteoblast response to pulsed laser deposited calcium phosphate coatings Author(s): Bigi A, Bracci B, Cuisinier F, et al., Source: BIOMATERIALS Volume: 26 Issue: 15 Pages: 2381-2389 Published: MAY 2005 citations 70

Tema 6: Prelucrari laser in trei dimensiuni

Subiectul 6.1: Functionalizarea optica a materialelor transparente: Aplicatii fotonice, tehnologia informatiilor, criptaj
Subiectul 6.2: Asamblare laser 3D, generare de dispozitive complexe (fotopolimerizare, sinteza 3D, etc). Prototipaj rapid
Subiectul 6.3: Micro, nano-sisteme, Systeme de analiza optico-chimica, opto-biologica
Subiectul 6.4: Aplicatii in biologie si medicina

-nanochirurgie celulara
-manipulari optice
-interactii locale asistate de nanoparticule
-metode calitative si cantitative de microscopie rapida, analiza dincolo de limita de difractie. Metode de analiza si reconstructie 3D (OCT, holografie digitala, etc.)

Subiectul 6.5: Suport: Tehnologii de monitorizare si diagnostic, Tehnologii de control de fascicol, Tehnologii laser, metrologie

Context: Realizari recente si perspective (la nivel international) :

Un efort international considerabil este depus astazi in domeniul opticii integrate pentru aplicatii in telecomunicatii si transport de informatie, tehnici analitice (micro-fluidica, lab-on-chip), optoelectronica si instrumentatie optica (astrofotonica, procesarea de informatie, etc). In speciale tehnicile de procesare 3D pot deschide aplicatii noi si grade de libertate suplimentare de functionare a dispozitivelor, cu impact socio-economic in special in domeniul IMM-urilor de inalta tehnicitate. De aici deriva o nevoie de dezvoltare de tehnici de procesare 3D ce implica utilizarea radiatiei laser (in mod particular pulsuri de durata scurta), in special pentru aplicatii si functionalizari de materiale unde dimensiunea de structurare are o importanta critica. Primul domeniu de aplicatii este cel al dispozitivelor fotonice integrate cu extensie in zona micro si nano-sistemelor. Un pionierat in domeniu poate fi recunoscut in citeva centre de cercetare din Jena, Southampton, Melbourne, Milano, etc. Parteneriate si proiecte la nivel european au fost lansate vizind domeniul de metode si dispozitive analitice precum si surse laser si statii de procesare.

De asemenea, domeniul de aplicatii laser in manipulare de materie, tehnici de microscopie de super-rezolutie, si interactia cu sisteme biologice cunoaste acum o dezvoltare fara precedent si raspunde unor necesitati imediate ale societatii. Notabile sint realizarile din centre universitare precum Glasgow, Saint-Andrews, Riso Laboratory, Urbana University, Harvard/Cornell Unversity, etc. *Acesta reprezinta un domeniu emergent cu mari posibilitati de dezvoltare pentru grupuri din Romania.*

In acelasi timp, o observatie comuna temelor 4-6 poate fi indicata. Interactia laser de mare precizie presupune un potential de control in timp real al fascicolului laser pentru optimizarea procedeelor. Acest control e corelat printr-o retroactiune cu rezultatul interactiei laser. De aici necesitatea dezvoltarii unor tehnici rapide (in timp-real) de analiza, si control cu potential in generarea unor procedee inteligente de iradiere.

Contributie romaneasca (recenta) si obiective propuse (viitor)

Cercetarea romaneasca vizeaza deja domeniul de aplicatii optice, optica integrata si procesare laser, cit si aplicatii in microscopie, biologie, medicina si productia de micro-nanosisteme.

Analiza WOS (perioada 2008-2011).

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
Laser 3D processing	300	10	4	3%	1	10%
Laser waveguide writing Laser photonics	2700	20	4	-	1	5%
Laser photopolymerization	275	12	3	-	1	8%
Rapid prototyping	320	10	5		0	-
Laser assembling	133	9	3		1	-
Laser surgery	3717	24	13		1	-
Laser MEMS-MOEMS	625	11	5		0	-
Optical tweezers	1386	28	1		0	-
Laser Optofluidics Microfluidics	269 (3555)	15 37	0 16		1 0	-
Optical Coherence Tomography	6214	35	28		3	-
Digital holography Laser	135	9	1		1	-

Concluzii: Fara a fi exhaustiva, analiza rezultatelor WOS arata ca, in relatie cu oportunitatile de procesare existente, potentialul de cercetare in laboratore din Romania poate fi crescut semnificativ, precum si masa critica. Este recomandabila initierea unor colaborari cu grupuri de renume sau cu experienta in domeniu, precum si o interactie intertematica (e.g. tema optica si fotonica). Acesta reprezinta un domeniu emergent in care asistenta pentru dezvoltarea si integrarea in continuare a infrastructurii in noile tendinte poate genera un motor de cercetare-dezvoltare pentru noi serii de aplicatii ce incep sa prinda contur.

Publicatii relevante (2008-2011)

1. Title: Femtosecond laser micromachining in transparent materials Author(s): Gattass RR, Mazur E, Source: NATURE PHOTONICS Volume: 2 Issue: 4 Pages: 219-225 Published: APR 2008 citations 160

2. Title: Demonstration of a spaser-based nanolaser Author(s): Noginov MA, Zhu G, Belgrave AM, et al. Source: NATURE Volume: 460 Issue: 7259 Pages: 1110-U68 Published: AUG 27 2009 citations 131

3. Title: Upconversion fluorescence imaging of cells and small animals using lanthanide doped nanocrystals Author(s): Chatteriee DK, Rufalhah AJ, Zhang Y Source: BIOMATERIALS Volume: 29 Issue: 7 Pages: 937-943 Published: MAR 2008 citations 129

4. Title: Single-molecule force spectroscopy: optical tweezers, magnetic tweezers and atomic force microscopy Author(s): Neuman KC, Nagy A Source: NATURE METHODS Volume: 5 Issue: 6 Pages: 491-505 Published: JUN 2008 citations 128

5. Title Polymer microfabrication technologies for microfluidic systems Author(s): Becker H, Gartner C, Source: ANALYTICAL AND BIOANALYTICAL CHEMISTRY Volume: 390 Issue: 1 Pages: 89-111 Published: JAN 2008 citations 118

6. Title: Recent advances in optical tweezers Author(s): Moffitt JR, Chemla YR, Smith SB, et al. Source: ANNUAL REVIEW OF BIOCHEMISTRY Volume: 77 Pages: 205-228 Published: 2008 citations 99

7. Title: Quantum memory for squeezed light Author(s): Appel J, Figueroa E, Korystov D, et al. Source: PHYSICAL REVIEW LETTERS Volume: 100 Issue: 9 Article Number: 093602 Published: MAR 7 2008 citations 86

8. Title: State-of-the-art retinal optical coherence tomography Author(s): Drexler W, Fujimoto JG Source: PROGRESS IN RETINAL AND EYE RESEARCH Volume: 27 Issue: 1 Pages: 45-88 Published: JAN 2008 citations 85

9. Title: Harnessing optical forces in integrated photonic circuits Author(s): Li M, Pernice WHP, Xiong C, et al. Source: NATURE Volume: 456 Issue: 7221 Pages: 480-U28 Published: NOV 27 2008 citations 80

10. Title: Laser direct-write techniques for printing of complex materials Author(s): Arnold CB, Serra P, Pique A Source: MRS BULLETIN Volume: 32 Issue: 1 Pages: 23-31 Published: JAN 2007 citations 66

11. Title: Photonic metamaterials by direct laser writing and silver chemical vapour deposition Author(s): Rill MS, Plet C, Thiel M, et al. Source: NATURE MATERIALS Volume: 7 Issue: 7 Pages: 543-546 Published: JUL 2008 citations 64

12. Title: Risk assessment for ectasia after corneal refractive surgery, Author(s): Randleman JB, Woodward M, Lynn MJ, et al., Source: OPHTHALMOLOGY Volume: 115 Issue: 1 Pages: 37-50 Published: JAN 2008 citations 63

13. Title: Refractive index maps and membrane dynamics of human red blood cells parasitized by Plasmodium falciparum Author(s): Park YK, Diez-Silva M, Popescu G, et al. Source: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE

UNITED STATES OF AMERICA Volume: 105 Issue: 37 Pages: 13730-13735 Published: SEP 16 2008 citations 49

14. Title: Femtosecond-laser-induced nanocavitation in water: Implications for optical breakdown threshold and cell surgery Author(s): Vogel A, Linz N, Freidank S, et al. Source: PHYSICAL REVIEW LETTERS Volume: 100 Issue: 3 Article Number: 038102 Published: JAN 25 2008 citations 48

15. Title: Bonding of thermoplastic polymer microfluidics Author(s): Tsao CW, DeVoe DL Source: MICROFLUIDICS AND NANOFLUIDICS Volume: 6 Issue: 1 Pages: 1-16 Published: JAN 2009 citations 43

16. Title: Advances in 3D nano/microfabrication using two-photon initiated polymerization Author(s): Lee KS, Kim RH, Yang DY, et al. Source: PROGRESS IN POLYMER SCIENCE Volume: 33 Issue: 6 Pages: 631-681 Published: JUN 2008 citations 40

17. Title: Free-radical-promoted cationic photopolymerization under visible light in aerated media: New and highly efficient silane-containing initiating systems Author(s): Lalevee J, El-Roz M, Allonas X, et al. Source: JOURNAL OF POLYMER SCIENCE PART A-POLYMER CHEMISTRY Volume: 46 Issue: 6 Pages: 2008-2014 Published: MAR 15 2008 citations 40

18. Title: A nanoelectromechanical tunable laser Author(s): Huang MCY, Zhou Y, Chang-Hasnain citations 40

19. Title: Recent progress in multiphoton microfabrication Author(s): Maruo S, Fourkas JT Source: LASER & PHOTONICS REVIEWS Volume: 2 Issue: 1-2 Pages: 100-111 Published: APR 2008 citations 38

20. Title: Three-dimensional random access multiphoton microscopy for functional imaging of neuronal activity Author(s): Reddy GD, Kelleher K, Fink R, et al. Source: NATURE NEUROSCIENCE Volume: 11 Issue: 6 Pages: 713-720 Published: JUN 2008 citations 36

21. Title: Polychromatic dynamic localization in curved photonic lattices Author(s): Szameit A, Garanovich IL, Heinrich M, et al. Source: NATURE PHYSICS Volume: 5 Issue: 4 Pages: 271-275 Published: APR 2009 citations 34

22. Title: Review on microfabricated micro-solid oxide fuel cell membranes Author(s): Evans A, Bieberle-Hutter A, Rupp JLM, et al. Source: JOURNAL OF POWER SOURCES Volume: 194 Issue: 1 Special Issue: Sp. Iss. SI Pages: 119-129 Published: OCT 20 2009 citations 32

23. 3. Title: Ultrahigh-resolution optical coherence tomography with monochromatic and chromatic aberration correction Author(s): Zawadzki RJ, Cense B, Zhang Y, et al. Source: OPTICS EXPRESS Volume: 16 Issue: 11 Pages: 8126-8143 Published: MAY 26 2008 citations 31

24. Title: Consolidation phenomena in laser and powder-bed based layered manufacturing Author(s): Kruth JP, Levy G, Klocke F, et al. Conference Information: 57th General Assmbly of CIRP, AUG 19-25, 2007 Dresden, GERMANY Source: CIRP ANNALS-

MANUFACTURING TECHNOLOGY Volume: 56 Issue: 2 Pages: 730-759 Published: 2007 citations 29

25. Title: A review of rapid prototyping techniques for tissue engineering purposes Author(s): Peltola SM, Melchels FPW, Grijpma DW, et al. Source: ANNALS OF MEDICINE Volume: 40 Issue: 4 Pages: 268-280 Published: 2008 citations 27

26. Title: Ultra-Low Shrinkage Hybrid Photosensitive Material for Two-Photon Polymerization Microfabrication Author(s): Ovsianikov A, Viertl J, Chichkov B, et al. Source: ACS NANO Volume: 2 Issue: 11 Pages: 2257-2262 Published: NOV 2008 citations 27

27. Title: Transition from thermal diffusion to heat accumulation in high repetition rate femtosecond laser writing of buried optical waveguides Author(s): Eaton SM, Zhang H, Ng ML, et al. Source: OPTICS EXPRESS Volume: 16 Issue: 13 Pages: 9443-9458 Published: JUN 23 2008 citations 27

28. Title: Micromachining of photonic devices by femtosecond laser pulses Author(s): Della Valle G, Osellame R, Laporta P Source: JOURNAL OF OPTICS A-PURE AND APPLIED OPTICS Volume: 11 Issue: 1 Article Number: 013001 Published: JAN 2009 citations 25

29. Title: Directly written monolithic waveguide laser incorporating a distributed feedback waveguide-Bragg grating Author(s): Marshall GD, Dekker P, Ams M, et al. Source: OPTICS LETTERS Volume: 33 Issue: 9 Pages: 956-958 Published: MAY 1 2008 citations 24

30. Title: Laser written waveguide photonic quantum circuits Author(s): Marshall GD, Politi A, Matthews JCF, et al. Source: OPTICS EXPRESS Volume: 17 Issue: 15 Pages: 12546-12554 Published: JUL 20 2009 citations 23

31. Title: Laser written waveguide photonic quantum circuits Author(s): Marshall GD, Politi A, Matthews JCF, et al.Source: OPTICS EXPRESS Volume: 17 Issue: 15 Pages: 12546-12554 Published: JUL 20 2009 citations 23

32. Title: Harmonic holography: a new holographic principle Author(s): Pu Y, Centurion M, Psaltis D Source: APPLIED OPTICS Volume: 47 Issue: 4 Pages: A103-A110 Published: FEB 1 2008 citations 21

33. Title: Two-photon stereolithography for realizing ultraprecise three-dimensional nano/microdevices Author(s): Park SH, Yang DY, Lee KS Source: LASER & PHOTONICS REVIEWS Volume: 3 Issue: 1-2 Pages: 1-11 Published: MAR 2009 citations 19

34. Title: Miniaturized probe for femtosecond laser microsurgery and two-photon imaging Author(s): Hoy CL, Durr NJ, Chen PY, et al. Source: OPTICS EXPRESS Volume: 16 Issue: 13 Pages: 9996-10005 Published: JUN 23 2008 citations 19

35. Title: Integration of femtosecond laser written optical waveguides in a lab-on-chip Author(s): Vazquez RM, Osellame R, Nolli D, et al. Source: LAB ON A CHIP Volume: 9 Issue: 1 Pages: 91-96 Published: 2009 citations 19

36. Title: Three-dimensional microfabrication of materials by femtosecond lasers for photonics applications Author(s): Juodkazis S, Mizeikis V, Misawa H Source: JOURNAL OF APPLIED PHYSICS Volume: 106 Issue: 5 Article Number: 051101 Published: SEP 1 2009 citations 18

37. Title: Ultrafast laser writing of homogeneous longitudinal waveguides in glasses using dynamic wavefront correction Author(s): Mauclair C, Mermillod-Blondin A, Huot N, et al. Source: OPTICS EXPRESS Volume: 16 Issue: 8 Pages: 5481-5492 Published: APR 14 2008 citations 18

38. Title: Dynamic ultrafast laser spatial tailoring for parallel micromachining of photonic devices in transparent materials Author(s): Mauclair C, Cheng G, Huot N, et al. Source: OPTICS EXPRESS Volume: 17 Issue: 5 Pages: 3531-3542 Published: MAR 2 2009 citations 15

39. Title: Single cell detection using a glass-based optofluidic device fabricated by femtosecond laser pulses Author(s): Kim M, Hwang DJ, Jeon H, et al. Source: LAB ON A CHIP Volume: 9 Issue: 2 Pages: 311-318 Published: 2009 citations 14

40. Title: Two-photon stereolithography for realizing ultraprecise three-dimensional nano/microdevices Author(s): Park SH, Yang DY, Lee KS Source: LASER & PHOTONICS REVIEWS Volume: 3 Issue: 1-2 Pages: 1-11 Published: MAR 2009 citations 19

41. Title: Time-resolved off-axis digital holography for characterization of ultrafast phenomena in water Author(s): Balciunas T, Melninkaitis A, Tamosauskas G, et al. Source: OPTICS LETTERS Volume: 33 Issue: 1 Pages: 58-60 Published: JAN 1 2008 citations 16

42. Title: Angular multiplexing in pulsed digital holography for aperture synthesis Author(s): Yuan CJ, Zhai HC, Liu HT Source: OPTICS LETTERS Volume: 33 Issue: 20 Pages: 2356-2358 Published: OCT 15 2008 citations 15

43. Title: Quantitative phase imaging by three-wavelength digital holography Author(s): Mann CJ, Bingham PR, Paquit VC, et al. Source: OPTICS EXPRESS Volume: 16 Issue: 13 Pages: 9753-9764 Published: JUN 23 2008 citations 15

44. Title: Three-Dimensional Structuring of Resists and Resins by Direct Laser Writing and Holographic Recording Author(s): Juodkazis S, Mizeikis V, Misawa H Source: PHOTORESPONSIVE POLYMERS I Book Series: ADVANCES IN POLYMER SCIENCE Volume: 213 Pages: 157-206 Published: 2008 citations 10

45. Title: Femtosecond laser ablation of neurons in C. elegans for behavioral studies Author(s): Chung SH, Mazur E Source: APPLIED PHYSICS A-MATERIALS SCIENCE & PROCESSING Volume: 96 Issue: 2 Pages: 335-341 Published: AUG 2009 citations 8

46. Title: Beat the diffraction limit in 3D direct laser writing in photosensitive glass Author(s): Bellec M, Royon A, Bousquet B, et al. Source: OPTICS EXPRESS Volume: 17 Issue: 12 Pages: 10304-10318 Published: JUN 8 2009 citations 7

47. Title: Ultracompact laser projection systems based on two-dimensional resonant microscanning mirrors Author(s): Scholles M, Brauer A, Frommhagen K, et al.

Conference Information: Conference on MOEMS and Miniaturized Systems VI, JAN 24-25, 2007 San Jose, CA Source: JOURNAL OF MICRO-NANOLITHOGRAPHY MEMS AND MOEMS Volume: 7 Issue: 2 Article Number: 021001 Published: APR-JUN 2008 citations 6

48. 2. Title: MEMS-based VCSEL beam steering using replicated polymer diffractive lens Author(s): Hedsten K, Melin J, Bengtsson J, et al. Conference Information: 20th Eurosensors Conference, SEP 17-20, 2006 Chalmers Univ Technol, Goteborg, SWEDEN Source: SENSORS AND ACTUATORS A-PHYSICAL Volume: 142 Issue: 1 Special Issue: Sp. Iss. SI Pages: 336-345 Published: MAR 10 2008 citations 6

49. Title: Surgical applications of femtosecond lasers Author(s): Chung SH, Mazur E Source: JOURNAL OF BIOPHOTONICS Volume: 2 Issue: 10 Pages: 557-572 Published: OCT 2009 citations 2

Articole cu participare romaneasca (2008-2011)

1. Title: Quality assessment of dental treatments using en-face optical coherence tomography
   Author(s): Sinescu C, Negrutiu ML, Todea C, et al. Source: JOURNAL OF BIOMEDICAL OPTICS Volume: 13 Issue: 5 Article Number: 054065 Published: SEP-OCT 2008 citations 9

2. Title: Layout for millimeter wave Composite Right/Left Handed devices obtained by femtosecond laser ablation Author(s): Zamfirescu M, Sajin G, Bunea A, et al. Source: JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 12 Issue: 3 Pages: 686-691 Published: MAR 2010 citations 3

3. Title: En face optical coherence tomography investigation of apical microleakage after laser-assisted endodontic treatment Author(s): Todea C, Balabuc C, Sinescu C, et al. Source: LASERS IN MEDICAL SCIENCE Volume: 25 Issue: 5 Pages: 629-639 Published: SEP 2010 citations 3

4. Title: In vivo imaging of dynamic biological specimen by real-time single-shot full-field optical coherence tomography Author(s): Hrebesh MS, Dabu R, Sato M Source: OPTICS COMMUNICATIONS Volume: 282 Issue: 4 Pages: 674-683 Published: FEB 15 2009 citations 3

5. Title: Arrays of soliton waveguides in lithium niobate for parallel coupling Author(s): Popescu ST, Petris A, Vlad VI, et al. Source: JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 12 Issue: 1 Pages: 19-23 Published: JAN 2010 citations 1

6. Title: LASER PROCESSING AND CHARACTERIZATION WITH FEMTOSECOND LASER PULSES, Author(s): Zamfirescu M, Ulmeanu M, Jipa F, et al., Source: ROMANIAN REPORTS IN PHYSICS Volume: 62 Issue: 3 Special Issue: Sp. Iss. SI Pages: 594-609 Published: 2010 citations 1

7. Title: FIRMWARE FOR LASER SURGICAL OPHTALMIC MICROSCOPES Author(s): Stanescu SL, Sava V, Cristea PD, et al. Source: REVUE ROUMAINE DES SCIENCES TECHNIQUES-SERIE ELECTROTECHNIQUE ET ENERGETIQUE Volume: 55 Issue: 4 Pages: 445-453 Published: OCT-DEC 2010 citations 0

8. Title: Application of ultrashort lasers pulses in micro- and nano-technologies Author(s): Zamfirescu M, Ulmeanu M, Jipa F, et al. Source: JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 12 Issue: 11 Pages: 2179-2184 Published: NOV 2010 citations 0

9. Title: RAPID PROTOTYPING TECHNIQUES Author(s): Oprisan RV, Matei AV, Zara A, et al. Conference Information: 14th International Conference on Modern Technologies, Quality and Innovation (ModTech 2010), MAY 20-22, 2010 Slanic-Moldova, ROMANIA Source: MODTECH 2010: NEW FACE OF TMCR, PROCEEDINGS Book Series: Proceedings of the International Conference ModTech Pages: 435-438 Published: 2010 citations 0

10. Title: Spatial frequency and fractal complexity in single-to-triple beam holograms Author(s): Scarlat EI, Mihailescu M, Sobetkii A Source: JOURNAL OF OPTOELECTRONICS AND ADVANCED MATERIALS Volume: 12 Issue: 1 Pages: 105-109 Published: JAN 2010 citations 0

11. Title: Laser applications in the field of MEMS - art. no. 70070K Author(s): Moagar-Poladian G, Illyefalvi-Vitez Z, Balogh B, et al. Conference Information: Conference on Industrial Laser Applications (INDLAS 2007), MAY 23-25, 2007 Bran, ROMANIA Source: INDLAS 2007: INDUSTRIAL LASER APPLICATIONS Book Series: PROCEEDINGS OF THE SOCIETY OF PHOTO-OPTICAL INSTRUMENTATION ENGINEERS (SPIE) Volume: 7007 Pages: K70-K70 Published: 2008 citations 0

12. Title: Sub-wavelength resolution laser lithography in the field of MEMS - art. no. 70070L Author(s): Moagar-Poladian G Conference Information: Conference on Industrial Laser Applications (INDLAS 2007), MAY 23-25, 2007 Bran, ROMANIA Source: INDLAS 2007: INDUSTRIAL LASER APPLICATIONS Book Series: PROCEEDINGS OF THE SOCIETY OF PHOTO-OPTICAL INSTRUMENTATION ENGINEERS (SPIE) Volume: 7007 Pages: L70-L70 Published: 2008 citations 0

Alte publicatii de interes 2000-2011

1. Title: Mechanisms of pulsed laser ablation of biological tissues Author(s): Vogel A, Venugopalan V Source: CHEMICAL REVIEWS Volume: 103 Issue: 2 Pages: 577-644 Published: FEB 2003 citations 405

2. Title: Corneal refractive surgery with femtosecond lasers Author(s): Juhasz T, Frieder H, Kurtz RM, et al. Source: IEEE JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS Volume: 5 Issue: 4 Pages: 902-910 Published: JUL-AUG 1999 citations 138

3. Title: Fabrication of woodpile structures by two-photon polymerization and investigation of their optical properties Author(s): Serbin J, Ovsianikov A, Chichkov B Source: OPTICS EXPRESS Volume:12 Issue: 21 Pages: 5221-5228 Published: OCT 18 2004 citations 136

4. Title: Technologies for nanofluidic systems: top-down vs. bottom-up - a review Author(s): Mijatovic D, Eijkel JCT, van den Berg A Source: LAB ON A CHIP Volume: 5 Issue: 5 Pages: 492-500 Published: 2005 citations 120

5. Title: Pulse energy dependence of subcellular dissection by femtosecond laser pulses Author(s): Heisterkamp A, Maxwell IZ, Mazur E, et al. Source: OPTICS EXPRESS Volume: 13 Issue: 10 Pages: 3690-3696 Published: MAY 16 2005 citations 76

6. Title: Large-area three-dimensional structuring by electrochemical etching and lithography Author(s): Matthias S, Muller F, Jamois C, et al. Source: ADVANCED MATERIALS Volume: 16 Issue: 23-24 Pages: 2166-+ Published: DEC 27 2004 citations 58

7. Title: Excimer laser machining for the fabrication of analogous microstructures Author(s): Zimmer K, Hirsch D, Bigl F Conference Information: 3rd International Conference on Laser Ablation (COLA 95), MAY 22-26, 1995 STRASBOURG, FRANCE Source: APPLIED SURFACE SCIENCE Volume: 96-8 Pages: 425-429 Published: APR 1996 citations 55

8. Title: Three-dimensional micro- and nano-structuring of materials by tightly focused laser radiation Author(s): Juodkazis S, Mizeikis V, Matsuo S, et al. Source: BULLETIN OF THE CHEMICAL SOCIETY OF JAPAN Volume: 81 Issue: 4 Pages: 411-448 Published: APR 15 2008 citations 19

9. Title: Fast three-dimensional laser micromachining of silicon for microsystems Author(s): Mullenborn M, Dirac H, Petersen JW, et al. Conference Information: 8th International Conference on Solid-State Sensors and Actuators (Eurosensors IX), JUN 25-29, 1995 STOCKHOLM, SWEDEN Source: SENSORS AND ACTUATORS A-PHYSICAL Volume: 52 Issue: 1-3 Pages: 121-125 Published: MAR-APR 1996 citations 18

10. Title: Contrasts in writing photonic structures with ultrafast and ultraviolet lasers Author(s): Coric D, Herman PR, Chen KP, et al. Conference Information: Conference on Optical Devices for Fiber Communication III, JAN 21-22, 2002 SAN JOSE, CA Source: OPTICAL DEVICES FOR FIBER COMMUNICATION III Book Series: PROCEEDINGS OF THE SOCIETY OF PHOTO-OPTICAL INSTRUMENTATION ENGINEERS (SPIE) Volume: 4638 Pages: 77-84 Published: 2002 citations 7

Tema 7: Materiale organice si bio-organice pentru detectie, diagnostic, terapie si administrare controlata de medicamente

Subiectul 7.1: Imobilizarea materialelor organice si bio-organice pentru dispozitive de detectie
Subiectul 7.2: Materiale organice si bio-onroganice pentru dispozitive de diagnostic medical
Subiectul 7.3: Materiale organice si bio-organice pentru aplicatii terapeutice
Subiectul 7.4: Materiale organice si bio-organice pentru administrare controlata de medicamente

Realizari recente si perspective la nivel international:

Dispozitivele de senzori care includ in compozitia lor materiale organice au devenit in ultimii ani primordiale pentru detectia de molecule analit in faza de vapori. Studiile recente indica posibilitatea de a adapta si a utiliza acesti senzori pentru detectia de molecule biologice complexe. Dezvoltarea acestei linii de cercetare pentru obtinerea de senzori flexibili si miniaturizati bazati pe electronica organica poate sa aduca beneficii importante in detectia compusilor chimici si biologici. Pe de alta parte, senzorii biologici care includ in compozitia lor molecule de enzime asigura identificarea selectiva a compusilor chimici in produse industriale, substante chimice, mediu, sau a moleculelor biologice pentru diagnostic medical. Acest tip de senzori ramane prima alegere pentru dispozitive de detectie miniaturizate datorita amplificarii lor inalte si a selectivitatii. Dezvoltarea tehnologiilor pentru imobilizarea moleculelor biologice ca elemente de recunoastere in biodetectori reprezinta un factor crucial in constructia biosenzorilor. In ultimii ani s-a acordat o atentie speciala optimizarii strategiilor pentru imobilizarea enzimelor. Nanomaterialele hibride care includ in compozitia lor atat compusi organici cat si inorganici reprezinta de asemenea o linie de cercetare importanta in ultimii ani atat pentru proiectarea de noi dispozitice de detectie cat si pentru aplicatii terapeutice. Aceste nanomateriale au avantajul ca includ proprietatile individuale ale componentelor organice si inorganice dar ofera si posibilitatea de acordare a caracteristicilor finale.

Contributie romaneasca recenta si obiective propuse:

Pe plan national liniile de cercetare cu cele mai importante rezultate publicate in ultimii ani sunt in domeniul polimerilor si biopolimerilor pentru aplicatii medicale, terapeutice si administare controlata de medicamente. Alte linii de cercetare semnificative sunt cele din domeniul biosenzorilor enzimatici si al sistemelor hibride organic-inorganic.

Analiza WoS perioada 2000-2011:

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)

enzyme biosensors	3.042	88	61	2.00	17	19.31
organic electronics based sensors	226	30	1	0.4	-	-
carbon nano-biosensors	2.022	88	11	0.54	3	3.40
biopolymers	4.849	94	33	0.68	6	6.38
nanoparticles therapy	4.817	106	31	0.64	5	4.71
polymeric drug delivery	8.865	137	65	0.73	9	6.56
organic inorganic drug delivery	260	33	7	2.69	3	9.09

7.1. Imobilizarea materialelor organice si bio-organice pentru dispozitive de detectie

Immobilization of acetylcholinesterase on screen-printed electrodes: comparative study between three immobilization methods and applications to the detection of organophosphorus insecticides
Author(s): Andreescu S, Barthelmebs L, Marty JL
Source: **ANALYTICA CHIMICA ACTA** Volume: **464** Issue: **2** Pages: **171-180** Published: **AUG 6 2002**
Times Cited: **86**

Reagentless biosensors based on self-deposited redox polyelectrolyte-oxidoreductases architectures
Author(s): Narvaez A, Suarez G, Popescu IC, et al.
Source: **BIOSENSORS & BIOELECTRONICS** Volume: **15** Issue: **1-2** Pages: **43-52** Published: **MAR 2000**
Times Cited: **70**

A strategy for enzyme immobilization on layer-by-layer dendrimer-gold nanoparticle electrocatalytic membrane incorporating redox mediator
Author(s): Crespilho FN, Ghica ME, Florescu M, et al.
Source: **ELECTROCHEMISTRY COMMUNICATIONS** Volume: **8** Issue: **10** Pages: **1665-1670** Published: **OCT 2006**
Times Cited: **47**

Screen-printed electrode based on AChE for the detection of pesticides in presence of organic solvents
Author(s): Andreescu S, Noguer T, Magearu V, et al.
Source: **TALANTA** Volume: **57** Issue: **1** Pages: **169-176** Published: **APR 22 2002**
Times Cited: **44**

Biosensors based on screen-printing technology, and their applications in environmental and food analysis
Author(s): Tudorache M, Bala C

Source: **ANALYTICAL AND BIOANALYTICAL CHEMISTRY** Volume: **388** Issue: **3** Pages: **565-578** Published: **JUN 2007**
Times Cited: **41**

Detection of pesticides using an amperometric biosensor based on ferophthalocyanine chemically modified carbon paste electrode and immobilized bienzymatic system
Author(s): Ciucu AA, Negulescu C, Baldwin RP
Source: **BIOSENSORS & BIOELECTRONICS** Volume: **18** Issue: **2-3** Pages: **303-310** Published: **MAR 2003**
Times Cited: **40**

Biosensors based on highly sensitive acetylcholinesterases for enhanced carbamate insecticides detection
Author(s): Bucur B, Fournier D, Danet A, et al.
Source: **ANALYTICA CHIMICA ACTA** Volume: **562** Issue: **1** Pages: **115-121** Published: **MAR 9 2006**
Times Cited: **36**

Biosensors designed for environmental and food quality control based on screen-printed graphite electrodes with different configurations
Author(s): Avramescu A, Andreescu S, Noguer T, et al.
Source: **ANALYTICAL AND BIOANALYTICAL CHEMISTRY** Volume: **374** Issue: **1** Pages: **25-32** Published: **SEP 2002**
Times Cited: **34**

Screen-printed electrodes with electropolymerized Meldola Blue as versatile detectors in biosensors
Author(s): Vasilescu A, Andreescu S, Bala C, et al.
Conference Information: 7th World Congress on Biosensors, MAY 15-17, 2002 KYOTO, JAPAN
Source: **BIOSENSORS & BIOELECTRONICS** Volume: **18** Issue: **5-6** Pages: **781-790** Published: **MAY 2003**
Times Cited: **32**

Chronoamperometric determination of D-lactate using screen-printed enzyme electrodes
Author(s): Avramescu A, Noguer T, Magearu V, et al.
Source: **ANALYTICA CHIMICA ACTA** Volume: **433** Issue: **1** Pages: **81-88** Published: **APR 4 2001**
Times Cited: **28**

Characterization of cobalt- and copper hexacyanoferrate-modified carbon film electrodes for redox-mediated biosensors
Author(s): Pauliukaite R, Florescu M, Brett CMA
Source: **JOURNAL OF SOLID STATE ELECTROCHEMISTRY** Volume: **9** Issue: **5** Pages: **354-362** Published: **MAY 2005**
Times Cited: **27**

Versatile method of cholinesterase immobilisation via affinity bonds using Concanavalin A applied to the construction of a screen-printed biosensor
Author(s): Bucur B, Danet AF, Marty JL
Source: **BIOSENSORS & BIOELECTRONICS** Volume: **20** Issue: **2** Pages: **217-225** Published: **SEP 15 2004**
Times Cited: **26**

Detection of organophosphorus insecticides with immobilized acetylcholinesterase - comparative study of two enzyme sensors
Author(s): Andreescu S, Avramescu A, Bala C, et al.
Source: **ANALYTICAL AND BIOANALYTICAL CHEMISTRY** Volume: **374** Issue: **1** Pages: **39-45** Published: **SEP 2002**
Times Cited: **26**

Immobilization of enzymes on screen-printed sensors via an histidine tail. Application to the detection of pesticides using modified cholinesterase

Author(s): Andreescu S, Magearu V, Lougarre A, et al.
Source: **ANALYTICAL LETTERS** Volume: **34** Issue: **4** Pages: **529-540** Published: **2001**
Times Cited: **25**

Bienzyme amperometric probes for choline and choline esters assembled with nonconducting electrosynthesized polymers
Author(s): Curulli A, Dragulescu S, Cremisini C, et al.
Source: **ELECTROANALYSIS** Volume: **13** Issue: **3** Pages: **236-242** Published: **MAR 2001**
Times Cited: **24**

Flow injection analysis of mercury(II) based on enzyme inhibition and thermometric detection
Author(s): Pirvutoiu S, Surugiu I, Dey ES, et al.
Source: **ANALYST** Volume: **126** Issue: **9** Pages: **1612-1616** Published: **SEP 2001**
Times Cited: **23**

Biosensors for phenol derivatives using biochemical signal amplification
Author(s): Stanca SE, Popescu IC, Oniciu L
Source: **TALANTA** Volume: **61** Issue: **4** Pages: **501-507** Published: **NOV 12 2003**
Times Cited: **21**

New potentiometric microbial biosensor for ethanol determination in alcoholic beverages
Author(s): Rotariu L, Bala C, Magearu V
Conference Information: 3rd Symposium on In Vino Analytica Scientia, JUL 10-12, 2003 Aveiro, PORTUGAL
Source: **ANALYTICA CHIMICA ACTA** Volume: **513** Issue: **1** Pages: **119-123** Published: **JUN 18 2004**
Times Cited: **20**

Amperometric biosensor based on horseradish peroxidase-immobilised magnetic microparticles
Author(s): Yu DH, Blankert B, Bodoki E, et al.
Source: **SENSORS AND ACTUATORS B-CHEMICAL** Volume: **113** Issue: **2** Pages: **749-754** Published: **FEB 27 2006**
Times Cited: **19**

The NADH electrochemical detection performed at carbon nanofibers modified glassy carbon electrode
Author(s): Arvinte A, Valentini F, Radoi A, et al.
Source: **ELECTROANALYSIS** Volume: **19** Issue: **14** Pages: **1455-1459** Published: **JUL 2007**
Times Cited: **15**

Yeast cells sucrose biosensor based on a potentiometric oxygen electrode
Author(s): Rotariu L, Bala C, Magearu V
Conference Information: 2nd In Vino Analytica Scientia Symposium, JUN 14-16, 2001 BORDEAUX, FRANCE
Source: **ANALYTICA CHIMICA ACTA** Volume: **458** Issue: **1** Pages: **215-222** Published: **APR 29 2002**
Times Cited: **15**

Organophosphorus insecticides extraction and heterogeneous oxidation on column for analysis with an acetylcholine sterase (AChE) biosensor
Author(s): Dondoi MP, Bucur B, Danet AF, et al.
Source: **ANALYTICA CHIMICA ACTA** Volume: **578** Issue: **2** Pages: **162-169** Published: **SEP 25 2006**
Times Cited: **12**

Micro-solid phase extraction with helical-solid-sorbent in the presence of organic solvent for gas chromatography-mass spectrometry analysis of per-O-methylated mono- and disaccharides
Author(s): Ciucanu I, Swallow KC, Caprita R
Source: **ANALYTICA CHIMICA ACTA** Volume: **519** Issue: **1** Pages: **93-101** Published: **AUG 9 2004**
Times Cited: **11**

Amperometric study of the inhibitory effect of carboxylic acids on tyrosinase
Author(s): Stanca SE, Popescu IC

Source: **JOURNAL OF MOLECULAR CATALYSIS B-ENZYMATIC** Volume: **27** Issue: **4-6** Pages: **221-225** Published: **MAR 1 2004**
Times Cited: **11**

Sensitive detection of organophosphorus pesticides using a needle type amperometric acetylcholinesterase-based bioelectrode. Thiocholine electrochemistry and immobilised enzyme inhibition
Author(s): Turdean GL, Popescu IC, Oniciu L, et al.
Source: **JOURNAL OF ENZYME INHIBITION AND MEDICINAL CHEMISTRY** Volume: **17** Issue: **2** Pages: **107-115** Published: **APR 2002**
Times Cited: **11**

Electrochemical behavior of carbon paste electrodes modified with methylene green immobilized on two different X type zeolites
Author(s): Gligor D, Muresan LM, Dumitru A, et al.
Source: **JOURNAL OF APPLIED ELECTROCHEMISTRY** Volume: **37** Issue: **2** Pages: **261-267** Published: **FEB 2007**
Times Cited: **11**

Electrochemical sensors based on platinum electrodes modified with hybrid inorganic-organic coatings for determination of 4-nitrophenol and dopamine
Author(s): Lupu S, Lete C, Marin M, et al.
Conference Information: 6th Spring Meeting of the International Society-of-Electrochemistry, MAR 16-19, 2008 Foz do Lguacu, BRAZIL
Source: **ELECTROCHIMICA ACTA** Volume: **54** Issue: **7** Pages: **1932-1938** Published: **FEB 28 2009**
Times Cited: **10**

Organic phase PPO biosensor based on hydrophilic films of electropolymerized polypyrrole
Author(s): Cristea C, Mousty C, Cosnier S, et al.
Source: **ELECTROCHIMICA ACTA** Volume: **50** Issue: **18** Pages: **3713-3718** Published: **JUN 10 2005**
Times Cited: **10**

7.2. *Materiale organice si bio-onroganice pentru dispozitive de diagnostic medical*

Prussian Blue and enzyme bulk-modified screen-printed electrodes for hydrogen peroxide and glucose determination with improved storage and operational stability
Author(s): Ricci F, Amine A, Tuta CS, et al.
Source: **ANALYTICA CHIMICA ACTA** Volume: **485** Issue: **1** Pages: **111-120** Published: **MAY 26 2003**
Times Cited: **52**

Development and evaluation of electrochemical glucose enzyme biosensors based on carbon film electrodes
Author(s): Florescu M, Brett CMA
Conference Information: Conference on Evaluation and Validation of Novel Biosensors in Real Environment and Food Samples, NOV 02-04, 2003 Mao, SPAIN
Source: **TALANTA** Volume: **65** Issue: **2** Pages: **306-312** Published: **JAN 30 2005**
Times Cited: **46**

Differential impedance Spectroscopy for monitoring protein immobilization and antibody-antigen reactions
Author(s): Sadik OA, Xu H, Gheorghiu E, et al.
Source: **ANALYTICAL CHEMISTRY** Volume: **74** Issue: **13** Pages: **3142-3150** Published: **JUL 1 2002**
Times Cited: **44**

HPLC-DAD determination of Metformin in human plasma using derivatization with p-nitrobenzoyl chloride in a biphasic system
Author(s): Tache F, David V, Farca A, et al.
Source: **MICROCHEMICAL JOURNAL** Volume: **68** Issue: **1** Pages: **13-19** Published: **JAN 2001**
Times Cited: **34**

Amperometric biosensor based on horseradish peroxidase-immobilised magnetic microparticles
Author(s): Yu DH, Blankert B, Bodoki E, et al.
Source: **SENSORS AND ACTUATORS B-CHEMICAL** Volume: **113** Issue: **2** Pages: **749-754** Published: **FEB 27 2006**
Times Cited: **19**

Yeast cells sucrose biosensor based on a potentiometric oxygen electrode
Author(s): Rotariu L, Bala C, Magearu V
Conference Information: 2nd In Vino Analytica Scientia Symposium, JUN 14-16, 2001 BORDEAUX, FRANCE
Source: **ANALYTICA CHIMICA ACTA** Volume: **458** Issue: **1** Pages: **215-222** Published: **APR 29 2002**
Times Cited: **15**

7.3. Materiale organice si bio-organice pentru aplicatii terapeutice

Magnetizable needles and wires - modeling an efficient way to target magnetic microspheres in vivo
Author(s): Iacob G, Rotariu O, Strachan NJC, et al.
Source: **BIORHEOLOGY** Volume: **41** Issue: **5** Pages: **599-612** Published: **2004**
Times Cited: **34**

Laser processing of advanced bioceramics
Author(s): Narayan RJ, Jin CM, Doraiswamy A, et al.
Source: **ADVANCED ENGINEERING MATERIALS** Volume: **7** Issue: **12** Pages: **1083-1098** Published: **DEC 2005**
Times Cited: **27**

Associative pullulan gels and their interaction with biological active substances
Author(s): Mocanu G, Mihai D, Picton L, et al.
Source: **JOURNAL OF CONTROLLED RELEASE** Volume: **83** Issue: **1** Pages: **41-51** Published: **SEP 18 2002**
Times Cited: **23**

Optimization of polyurethane membranes - Morphology and structure studies
Author(s): Melnig V, Apostu MO, Tura V, et al.
Source: **JOURNAL OF MEMBRANE SCIENCE** Volume: **267** Issue: **1-2** Pages: **58-67** Published: **DEC 15 2005**
Times Cited: **16**

Nanoporous silicon matrix used as biomaterial
Author(s): Simion M, Kleps I, Neghina T, et al.
Conference Information: 12th International Symposium on Metastable and Nano-Materials (ISMANAM-2005), JUL 03-07, 2005 Paris, FRANCE
Source: **JOURNAL OF ALLOYS AND COMPOUNDS** Volume: **434** Special Issue: **Sp. Iss. SI** Pages: **830-832** Published: **MAY 31 2007**
Times Cited: **14**

Cobalt nanoparticles coated with graphitic shells as localized radio frequency absorbers for cancer therapy
Author(s): Xu Y, Mahmood M, Li ZR, et al.
Source: **NANOTECHNOLOGY** Volume: **19** Issue: **43** Article Number: **435102** Published: **OCT 29 2008**
Times Cited: **13**

Chronic Treatment with Nanoparticles Exacerbate Hyperthermia Induced Blood-Brain Barrier Breakdown, Cognitive Dysfunction and Brain Pathology in the Rat. Neuroprotective Effects of Nanowired-Antioxidant Compound H-290/51
Author(s): Sharma HS, Ali SF, Tian ZR, et al.
Conference Information: 1st International Symposium on Nanoneuroscience - Nanoeuroprotection and Nanoeurotoxicity, AUG 20-26, 2007 Killithea, GREECE
Source: **JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY** Volume: **9** Issue: **8** Pages: **5073-5090** Published: **AUG 2009**
Times Cited: **9**

7.4. Materiale organice si bio-organice pentru administrare controlata de medicamente

Designing of 'intelligent' liposomes for efficient delivery of drugs
Author(s): Voinea M, Simionescu M
Source: **JOURNAL OF CELLULAR AND MOLECULAR MEDICINE** Volume: **6** Issue: **4** Pages: **465-474** Published: **OCT-DEC 2002**
Times Cited: **37**

Evaluation of multivalent dendrimers based on melamine: Kinetics of thiol-disulfide exchange depends on the structure of the dendrimer
Author(s): Zhang W, Tichy SE, Perez LM, et al.
Source: **JOURNAL OF THE AMERICAN CHEMICAL SOCIETY** Volume: **125** Issue: **17** Pages: **5086-5094** Published: **APR 30 2003**
Times Cited: **31**

Polymeric micelles for oral drug delivery: Why and how
Author(s): Francis MF, Cristea M, Winnik FM
Conference Information: 39th IUPAC Congress/86th Conference of the Canadian-Society-for-Chemistry, AUG 10-15, 2003 Ottawa, CANADA
Source: **PURE AND APPLIED CHEMISTRY** Volume: **76** Issue: **7-8** Pages: **1321-1335** Published: **JUL-AUG 2004**
Times Cited: **30**

Preparation and characterization of starch/cyclodextrin bioadhesive microspheres as platform for nasal administration of Gabexate Mesylate (Foy (R)) in allergic rhinitis treatment
Author(s): Fundueanu G, Constantin M, Dalpiaz A, et al.
Source: **BIOMATERIALS** Volume: **25** Issue: **1** Pages: **159-170** Published: **JAN 2004**
Times Cited: **25**

Engineering polysaccharide-based polymeric micelles to enhance permeability of cyclosporin a across Caco-2 cells
Author(s): Francis MF, Cristea M, Yang YL, et al.
Source: **PHARMACEUTICAL RESEARCH** Volume: **22** Issue: **2** Pages: **209-219** Published: **FEB 2005**
Times Cited: **23**

Preparation and characterization of pH- and temperature-sensitive pullulan microspheres for controlled release of drugs
Author(s): Fundueanu G, Constantin M, Ascenzi P
Source: **BIOMATERIALS** Volume: **29** Issue: **18** Pages: **2767-2775** Published: **JUN 2008**
Times Cited: **20**

New magnetic organic-inorganic composites based on hydrotalcite-like anionic clays for drug delivery
Author(s): Carja G, Chiriac H, Lupu N
Conference Information: 6th International Conference on the Scientific and Clinical Applications of Magnetic Carriers, MAY 17-30, 2006 IMC Univ Appl Sci, Krems, AUSTRIA
Source: **JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS** Volume: **311** Issue: **1** Pages: **26-30**

Published: **APR 2007**
Times Cited: **15**

Polymeric materials for ophthalmic drug delivery: trends and perspectives
Author(s): Barbu E, Verestiuc L, Nevell TG, et al.
Source: **JOURNAL OF MATERIALS CHEMISTRY** Volume: **16** Issue: **34** Pages: **3439-3443** Published: **2006**
Times Cited: **15**

MAPLE applications in studying organic thin films
Author(s): Jelinek M, Kocourek T, Remsa J, et al.
Source: **LASER PHYSICS** Volume: **17** Issue: **2** Pages: **66-70** Published: **FEB 2007**
Times Cited: **11**

Nonlinear calibrations on the assay of dilitiazem and two of its metabolites from plasma samples by means of liquid chromatography and ESI/MS2 detection: application to a bioequivalence study
Author(s): Georgita C, Albu F, David V, et al.
Source: **BIOMEDICAL CHROMATOGRAPHY** Volume: **22** Issue: **3** Pages: **289-297** Published: **MAR 2008**
Times Cited: **9**

Tema 8: Tehnici inovative pentru procesarea si caracterizarea materialelor la scara nanometrica (sau sub-micrometrica)

Subiectul 8.1: Tehnici de procesare,mecanisme de formare si autoasamblare
Subiectul 8.2: Metode de caracterizare

Realizari recente si perspective la nivel international:

Materialele la scara nanometrica se afla in atentia comunitatii stiintifice datorita proprietatilor specifice care permit dezvoltarea de noi aplicatii in electronica, medicina, mediu si energie, chimie, farmaceutica, biotehnologie. Aceste proprietati pot fi foarte diferite de cele ale materialelor analoage in forma de "bulk" si sunt determinate de morfologia, forma si dimensiunea nanostructurilor. In consecinta, obiectivul principal al cercetarilor il reprezinta dezvoltarea de noi tehnici efective pentru fabricarea de materiale cu o morfologie controlata si astfel cu proprietati acordabile. Prin aceste tehnici si noi metode de caracterizare materialele nanostructurate se afla in centrul cercetarilor in domeniul fizicii aplicate, stiinta materialelor si inginerie.

Contributie romaneasca recenta si obiective propuse:

Cercetarea romaneasca in acest in domeniu include in ultimii ani atat dezvoltarea de noi metode de nanostructurare a materialelor, oxizi, metale, materiale polimerice, carbon, materiale hibride organice-inorganice, cat si caracterizarea lor pentru aplicatii medicale, optice, sau in domeniul senzorilor de gaz. Analiza WoS arata prezenta semnificativa a contributiilor romanesti in acest domeniu.

Analiza WoS perioada 2000-2011:

Cuvinte cheie căutate pe WoS	Nr. total articole	h-index	Nr. articole RO	Procent articole (%)	h-index RO	Procent h-index (%)
oxide nanostructures	8.025	118	45	0.56	10	8.47
metal nanostructures	7.418	130	40	0.53	8	6.15
carbon nanostructures	6.816	127	82	1.20	12	9.44
semiconductor nanostructures	4.331	111	21	0.48	5	4.50
polymer nanostructures	3.401	97	31	0.91	4	4.12

hybrid organic - inorganic nanostructures	1.660	73	18	1.08	4	5.47
colloidal nanostructures	1.338	80	11	0.82	2	2.50

Articole relevante cu participare romaneasca (2000-2011):

8.1. Tehnici de procesare, mecanisme de formare si autoasamblare

A new method for fast preparation of highly surface-enhanced Raman scattering (SERS) active silver colloids at room temperature by reduction of silver nitrate with hydroxylamine hydrochloride
Author(s): Leopold N, Lendl B
Source: **JOURNAL OF PHYSICAL CHEMISTRY B** Volume: **107** Issue: **24** Pages: **5723-5727** Published: **JUN 19 2003**
Times Cited: **165**

Preparation of Ru nanoparticles supported on gamma-Al2O3 and its novel catalytic activity for ammonia synthesis
Author(s): Miyazaki A, Balint L, Aika K, et al.
Source: **JOURNAL OF CATALYSIS** Volume: **204** Issue: **2** Pages: **364-371** Published: **DEC 10 2001**
Times Cited: **91**

Microparticle formation and its mechanism in single and double emulsion solvent evaporation
Author(s): Rosca ID, Watari F, Uo M
Source: **JOURNAL OF CONTROLLED RELEASE** Volume: **99** Issue: **2** Pages: **271-280** Published: **SEP 30 2004**
Times Cited: **60**

New materials for micro-scale sensors and actuators An engineering review
Author(s): Wilson SA, Jourdain RPJ, Zhang Q, et al.
Source: **MATERIALS SCIENCE & ENGINEERING R-REPORTS** Volume: **56** Issue: **1-6** Pages: **1-129** Published: **JUN 21 2007**
Times Cited: **57**

Influence of the silica based matrix on the formation of iron oxide nanoparticles in the Fe2O3-SiO2 system, obtained by sol-gel method
Author(s): Jitianu A, Crisan M, Meghea A, et al.
Source: **JOURNAL OF MATERIALS CHEMISTRY** Volume: **12** Issue: **5** Pages: **1401-1407** Published: **2002**
Times Cited: **47**

Microwave synthesis and characterization of Co-ferrite nanoparticles
Author(s): Bensebaa F, Zavaliche F, L'Ecuyer P, et al.
Source: **JOURNAL OF COLLOID AND INTERFACE SCIENCE** Volume: **277** Issue: **1** Pages: **104-110** Published: **SEP 1 2004**
Times Cited: **45**

Gold films deposited over regular arrays of polystyrene nanospheres as highly effective SERS substrates from visible to NIR
Author(s): Baia L, Baia M, Popp J, et al.
Source: **JOURNAL OF PHYSICAL CHEMISTRY B** Volume: **110** Issue: **47** Pages: **23982-23986** Published: **NOV 30 2006**
Times Cited: **38**

The design and investigation of room temperature thermotropic nematic gold nanoparticles
Author(s): Cseh L, Mehl GH
Source: **JOURNAL OF THE AMERICAN CHEMICAL SOCIETY** Volume: **128** Issue: **41** Pages: **13376-13377** Published: **OCT 18 2006**
Times Cited: **31**

TiO2 nanosized powders by TiCl4 laser pyrolysis
Author(s): Alexandrescu R, Dumitrache F, Morjan I, et al.
Source: **NANOTECHNOLOGY** Volume: **15** Issue: **5** Pages: **537-545** Published: **MAY 2004**
Times Cited: **30**

Controlling gold nanoparticle assemblies for efficient surface-enhanced Raman scattering and localized surface plasmon resonance sensors
Author(s): Toderas F, Baia M, Baia L, et al.
Source: **NANOTECHNOLOGY** Volume: **18** Issue: **25** Article Number: **255702** Published: **JUN 27 2007**
Times Cited: **27**

The effect of the cobalt loading on the growth of single wall carbon nanotubes by CO disproportionation on Co-MCM-41 catalysts
Author(s): Chen Y, Ciuparu D, Lim S, et al.
Source: **CARBON** Volume: **44** Issue: **1** Pages: **67-78** Published: **JAN 2006**
Times Cited: **27**

Stable silver colloidal dispersions using short chain polyethylene glycol
Author(s): Popa M, Pradell T, Crespo D, et al.
Source: **COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS** Volume: **303** Issue: **3** Pages: **184-190** Published: **AUG 15 2007**
Times Cited: **25**

Nearly monodispersed carbon coated iron nanoparticles for the catalytic growth of nanotubes/nanofibres
Author(s): Dumitrache F, Morjan I, Alexandrescu R, et al.
Conference Information: Symposium on Carbon Materials for Active Electronics held at the Spring Meeting of the European-Materials-Research-Society, JUN 10-13, 2003 Strasbourg, FRANCE
Source: **DIAMOND AND RELATED MATERIALS** Volume: **13** Issue: **2** Pages: **362-370** Published: **FEB 2004**
Times Cited: **25**

New SnO2 nano-clusters obtained by sol-gel route, structural characterization and their gas sensing applications
Author(s): Jitianu A, Altindag Y, Zaharescu M, et al.
Conference Information: 11th International Workshop on Glasses, Cermics, Hydrids and Nanocomposites from Gels (Sol-Gel 2001), SEP 16-21, 2001 ABANO TERME, ITALY
Source: **JOURNAL OF SOL-GEL SCIENCE AND TECHNOLOGY** Volume: **26** Issue: **1-3** Pages: **483-488** Published: **JAN 2003**
Times Cited: **23**

Experiments for inorganic-organic hybrid sol-gel films for micro- and nano-photonics
Author(s): Jitianu A, Gartner M, Zaharescu M, et al.
Conference Information: Spring Meeting of the European-Materials-Research-Society (E-MRS), JUN 18-21, 2002 STRASBOURG, FRANCE
Source: **MATERIALS SCIENCE & ENGINEERING C-BIOMIMETIC AND SUPRAMOLECULAR SYSTEMS** Volume: **23** Issue: **1-2** Pages: **301-306** Published: **JAN 15 2003**
Times Cited: **18**

Micro/nano-optoelectromechanical systems
Author(s): Dragoman D, Dragoman M
Source: **PROGRESS IN QUANTUM ELECTRONICS** Volume: **25** Issue: **5-6** Pages: **229-290** Published:

2001
Times Cited: **18**

Ti-base bulk nanostructure-dendrite composites: Microstructure and deformation
Author(s): Eckert J, Das J, He G, et al.
Conference Information: 12th International Conference on Rapidly Quenched and Metastable Materials, AUG 21-26, 2005 Jeju Isl, SOUTH KOREA
Source: **MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING** Volume: **449** Pages: **24-29** Published: **MAR 25 2007**
Times Cited: **17**

Mono- and bifunctional MFI, BEA and MCM-41 titanium-molecular sieves. Part 1. Synthesis and characterization
Author(s): On DT, Nguyen SV, Hulea V, et al.
Source: **MICROPOROUS AND MESOPOROUS MATERIALS** Volume: **57** Issue: **2** Pages: **169-180** Published: **JAN 16 2003**
Times Cited: **17**

Thin film composites of nanocarbons-polyaniline obtained by plasma polymerization technique
Author(s): Nastase C, Nastase F, Dumitru A, et al.
Conference Information: Spring Meeting of the European-Materials-Research-Society, MAY 24-28, 2004 Strasbourg, FRANCE
Source: **COMPOSITES PART A-APPLIED SCIENCE AND MANUFACTURING** Volume: **36** Issue: **4** Pages: **481-485** Published: **2005**
Times Cited: **16**

Electrostatic self-assembled nano architectures between polycations of integral type and azo dyes
Author(s): Dragan S, Schwarz S, Eichhorn KJ, et al.
Conference Information: International Symposium on Electrokinetic Phenomena, OCT 03-06, 2000 DRESDEN, GERMANY
Source: **COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS** Volume: **195** Issue: **1-3** Pages: **243-251** Published: **DEC 30 2001**
Times Cited: **16**

Nano-transistors in the Landauer-Buttiker formalism
Author(s): Nemnes GA, Wulf U, Racec PN
Source: **JOURNAL OF APPLIED PHYSICS** Volume: **96** Issue: **1** Pages: **596-604** Published: **JUL 1 2004**
Times Cited: **14**

Thermally controlled synthesis of single-wall carbon nanotubes with selective diameters
Author(s): Dervishi E, Li ZR, Watanabe F, et al.
Source: **JOURNAL OF MATERIALS CHEMISTRY** Volume: **19** Issue: **19** Pages: **3004-3012** Published: **2009**
Times Cited: **12**

Self-assembly characteristics of gold nanoparticles in the presence of cysteine
Author(s): Mocanu A, Cernica I, Tomoaia G, et al.
Source: **COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS** Volume: **338** Issue: **1-3** Pages: **93-101** Published: **APR 15 2009**
Times Cited: **9**

8.2. Metode de caracterizare

Surface anisotropy in ferromagnetic nanoparticles
Author(s): Labaye Y, Crisan O, Berger L, et al.
Conference Information: 46th Annual Conference on Magnetism and Magnetic Materials, NOV 12-16, 2001 SEATTLE, WASHINGTON

Source: **JOURNAL OF APPLIED PHYSICS** Volume: **91** Issue: **10** Pages: **8715-8717** Part: **Part 3** Published: **MAY 15 2002**
Times Cited: **60**

Transition from localized surface plasmon resonance to extended surface plasmon-polariton as metallic nanoparticles merge to form a periodic hole array
Author(s): Murray WA, Astilean S, Barnes WL
Source: **PHYSICAL REVIEW B** Volume: **69** Issue: **16** Article Number: **165407** Published: **APR 2004**
Times Cited: **54**

Adhesively-tensed cell membranes: Lysis kinetics and atomic force microscopy probing
Author(s): Hategan A, Law R, Kahn S, et al.
Source: **BIOPHYSICAL JOURNAL** Volume: **85** Issue: **4** Pages: **2746-2759** Published: **OCT 2003**
Times Cited: **48**

EPR study of a place-exchange reaction on Au nanoparticles: Two branches of a disulfide molecule do not adsorb adjacent to each other
Author(s): Ionita P, Caragheorgheopol A, Gilbert BC, et al.
Source: **JOURNAL OF THE AMERICAN CHEMICAL SOCIETY** Volume: **124** Issue: **31** Pages: **9048-9049** Published: **AUG 7 2002**
Times Cited: **46**

Probing the enhancement mechanisms of SERS with p-aminothiophenol molecules adsorbed on self-assembled gold colloidal nanoparticles
Author(s): Baia M, Toderas F, Baia L, et al.
Source: **CHEMICAL PHYSICS LETTERS** Volume: **422** Issue: **1-3** Pages: **127-132** Published: **APR 28 2006**
Times Cited: **43**

The relevance of Ru nanoparticles morphology and oxidation state to the partial oxidation of methane
Author(s): Balint I, Miyazaki A, Aika K
Source: **JOURNAL OF CATALYSIS** Volume: **220** Issue: **1** Pages: **74-83** Published: **NOV 15 2003**
Times Cited: **37**

Magnetizable needles and wires - modeling an efficient way to target magnetic microspheres in vivo
Author(s): Iacob G, Rotariu O, Strachan NJC, et al.
Source: **BIORHEOLOGY** Volume: **41** Issue: **5** Pages: **599-612** Published: **2004**
Times Cited: **34**

Recent advances in sheathless interfacing of capillary electrophoresis and electrospray ionization mass spectrometry
Author(s): Zamfir AD
Source: **JOURNAL OF CHROMATOGRAPHY A** Volume: **1159** Issue: **1-2** Pages: **2-13** Published: **AUG 3 2007**
Times Cited: **33**

Surface-enhanced Raman scattering efficiency of truncated tetrahedral Ag nanoparticle arrays mediated by electromagnetic couplings
Author(s): Baia M, Baia L, Astilean S, et al.
Source: **APPLIED PHYSICS LETTERS** Volume: **88** Issue: **14** Article Number: **143121** Published: **APR 3 2006**
Times Cited: **29**

Imaging of stored charges in Si quantum dots by tapping and electrostatic force microscopy
Author(s): Guillemot C, Budau P, Chevrier J, et al.
Source: **EUROPHYSICS LETTERS** Volume: **59** Issue: **4** Pages: **566-571** Published: **AUG 2002**
Times Cited: **26**

Functionalization of single-walled carbon nanotubes with conducting polymers evidenced by Raman and FTIR spectroscopy
Author(s): Lefrant S, Baibarac M, Baltog I, et al.
Conference Information: 15th European Conference on Diamond, Diamond-Like Materials, Carbon Nanotubes, Nitrides, and Silicon Carbide, SEP 12-17, 2004 Riva del Garda, ITALY
Source: **DIAMOND AND RELATED MATERIALS** Volume: **14** Issue: **3-7** Special Issue: **Sp. Iss. SI** Pages: **867-872** Published: **MAR-JUL 2005**
Times Cited: **22**

Electrochemical impedance spectroscopy and corrosion behaviour of Al2O3-Ni nano composite coatings
Author(s): Ciubotariu AC, Benea L, Lakatos-Varsanyi M, et al.
Source: **ELECTROCHIMICA ACTA** Volume: **53** Issue: **13** Pages: **4557-4563** Published: **MAY 20 2008**
Times Cited: **14**

Influence of symmetry and Coulomb correlation effects on the optical properties of nitride quantum dots
Author(s): Baer N, Schulz S, Gartner P, et al.
Source: **PHYSICAL REVIEW B** Volume: **76** Issue: **7** Article Number: **075310** Published: **AUG 2007**
Times Cited: **11**

III. RESURSE EXISTENTE (max 15 pag)

(la nivel subiect/tema/domeniu, dupa caz)

1. Resurse umane si educationale (accent pe dinamica/perspectiva)

Pricipalele centre in care se fac cercetari de fizica aplicata sunt:

Institutul National de CD pentru Fizica Materialelor

Institutul National de CD pentru Fizica Laserilor, Plasmei si Radiatiilor

Institutul National de CD pentru Fizica Tehnica Iasi

Universitatea Babes-Bolyai Cluj-Napoca

Institutul National de CD pentru Optoelectronica

Institutul National de CD pentru Inginerii Izotopice si Moleculare Cluj

Universitatea Politehnica Bucuresti

Universitatea de Vest Timisoara (lichide magnetice)

Institutiile de mai sus concentreaza majoritatea resurselor umane in domeniul Fizica Aplicata. INCD-urile trec in momentul de fata printr-un proces dificil de schimbare de generatii. In decursul anilor 90 multi cercetatori tineri (25-35 ani) au plecat in strainatate din cauza conditiilor financiare dificile din tara. Majoritatea lor nu au mai revenit in tara, astfel incat segmentul de varsta 40-50 ani este slab reprezentat. Imbucurator insa este faptul ca, in ultimii 5 ani, din ce in ce mai multi tineri cu varsta pana in 30 de ani au ales sa ramana in tara. Astfel segmentele de varsta pana in 35 de ani si cele peste 55 ani sunt bine reprezentate in cercetare.

Pe termen scurt si mediu, eforturi vor trebui facute pentru a atrage cat mai multi cercetatori din strainatate si de a impiedica exodul tinerilor in tari dezvoltate.

IV. POTENTIAL APLICATIV SI IMPACT ECONOMIC

(la nivel subiect/tema/domeniu, dupa caz; max 10 pag)

V. ANALIZA SWOT

(puncte tari, slabe, oportunitati, si riscuri la nivel de domeniu; max 5 pag)

VI. OBIECTIVE SI PRIORITATI STRATEGICE PE TERMEN SCURT (2012-2014) SI MEDIU (2015-2020)

(la nivel de domeniu; max 10 pag)

VII. RECOMANDARI (max 5 pag)

In total, maxim 100 de pagini.

Observatie. Cuprinsul rapoartelor pentru grupurile de „Fizica Aplicata” si „Educatie” se va stabili separat, in corelare cu continutul celorlalte rapoarte.

Anexa 1 : INCDFLPR

Infrastructura de cercetare (la nivel national si european/international): – achizitii noi efectuate in ultimii 5 ani

- dotare laborator « Interactiuni Laser-Suprafata-Plasma », http://lspi.inflpr.ro

Descriere Echipamente principale

A. Sursa laser:

Lambda Physics Coherent - excimer laser source, model COMPexPro 205, operational since February 2007

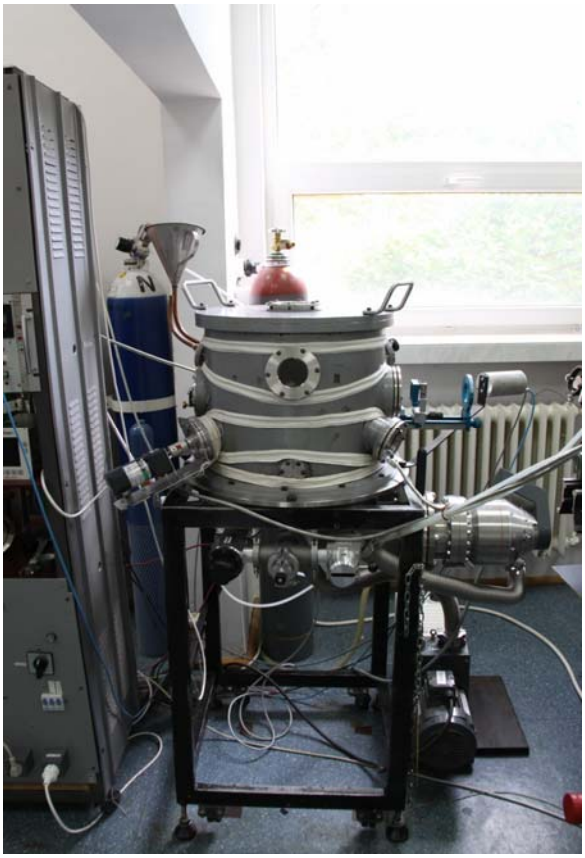
Main operation parameters and characteristics	
Wavelength(nm)	248
Pulse Energy (mJ)	700
Max. Rep. Rate (Hz)	50
Average Power (W)	30
Energy Stability (1 sigma) (%)	1
Pulse Duration (ns)	25
Beam Dimensions (V x H) (mm2)	24 x 6 to 12
Beam Divergence (V x H) (mrad2)	3 x 1
Dimensions (L x W x H) Laser Head	1682 x 375 x793 mm3 (67 x 15 x 31 in.3)
Vacuum Pump	530 x 230 x240 mm3 (21 x 9 x 9 in.3)
Water Cooling	2 to 3 l/min. (0.5 to 0.8 gal./min.), 15 to 20°C, connection: ½²

B. Camere de depunere si accesorii:

B.1. Stainless steel high vacuum chamber, with Cu gaskets or viton O-rings with vacuum performances of up to 10-8 Pa

- 45.72 cm diameter
- 4 CF 150 flanges (for heater, target, substrate and vacuum pump)
- 2 CF 50 ports for laser beam access in the chamber
- 4 CF 35 flanges for gauges and lateral view
- 3 CF16 flanges for gas valve, evacuation valve, and Pirani probe
- gas flowing controller MKS
- high vacuum pumping system Pfeifer
- carrousel type system with 5 target holders
- Stanford residual gas analyzer RGA200 200 amu RGA w/RS-232 interface (detector: Faraday cup, electron multiplier, resolution better than 0.5 amu@10% peak height, operating range10^{-4} Torr)

B.2. Stainless steel vacuum chamber



- 42 cm diameter
- temperature controller, model Eurotherm 2146, t_{max} = 12000 C
- preliminary Rotary SD 2033D vacuum pump
- high vacuum pumping system (vacuum system with turbomolecular high capacity pump, Alcatel ATP 400) $P_{min}= 10^{-6}$ Pa
- 3 gauges measuring the pressure inside the chamber
- gas flowing controller MKS50
- carrousel type system with 5 target holders

C. Prepararea tintei si prezervare de probe:

C.1. Ohaus Explorer Pro analitical balance (operating in our Laboratory since november 2008)

Capacity (g)	62
Readability (mg)	0.1
Repeatability (Std. dev.) (mg)	0.1
Linearity (mg)	0.2
Stabilization time (s)	4

C.2. TALASI SAFETY CABINET - with centrifugal exhauster VSB 20

MAIN PARAMETERS	
Maximum capacity (mc/h)	950
Noise (db)	>62
Piping vent (mm)	200
EQUIPMENT	electric control panel
	2 meshes 220V – 16A
	table: fireproof laminated plastic, ceramic plates, stainless steel AISI 304 – 316, polypropylene, granite stone
	centrifugal exhauster VSB 20

C.3. Vertical laminar airflow cabinet BSC-EN I – II

Caracteristici:
- Class II protection cabinet EN-12469
- vertical laminar flow-
- stainless steel AISI 304 walls and workspace

Model	**BSC-EN 1-3**
Int. dims (Lxhxl) (mm)	885 x 660 x 580
Ext.dims (Lxhxl) (mm)	1090 x 1470 x 780
Power (kW)	0,7
Opening (mm)	200
Temperature variation (°C)	<4
Electrical supply (Hz)	220 V/50
Noise (dBA)	< 59
Lighting (lux)	> 1.000
Vibrations	<0,005 mm rms

Accesorii:

UV Lamp
Charcoal evacuation filter
Supplementary outlet
Anti-blowback valve

C.4. Sistem cu apa de inalta puritate TKA Pacific UP/UPW6
Performanta
- Rata de curgere (at 15 ^{o}C): 6 L/h
- Retentie de bacterii si particule: 99%

TKA GenPure Ultra Pure Water System accessory with UV-intensity and TOC monitoring – Ultra pure water quality:

- Conductivity: 0.055 µS/cm
- Bacterial content: 1 CFU/ml
- TOC 1: 10 ppb
- Pyrogen free

C.5. Retsch centrifugal ball mill (Type S 100)

Dimensions (mm)	Height: up to approx. 420 mm; Width: 350 mm; Depth:510 mm with cover open; Height: up to approx. 630 mm; Width: 350 mm; Depth: 510 mm
Speed of grinding jars (min^{-1})	**400** - with grinding jar type "S" standard 500 ml special steel and 7 grinding balls, 30 mm diameter in tungsten carbide **500** - with grinding jar type "S" standard 250 ml tungsten carbide and 5 grinding balls 30 mm diameter in tungsten carbide **580 max** - with grinding jar type "S" standard 50 ml tungsten carbide and 3 grinding balls 20 mm diameter in tungsten carbide
Rated power (W)	approx. 100
IP rating	IP40/IP20 vessel to casing
Rated speed of motor (cm^{-1})	2500

C.6. Velp Scientifica Vortex Wizard agitator

Two operation modes:
- SENSOR - automatically activates the stirring when the test tube enters the interception field of an incorporated optical system
- CONTINUOUS enables uninterrupted work with different accessories

Features
- Infrared motion detector to activate agitation in a "no-touch" mode
- Microprocessor control of ramping speed (from 0 to 3000 rpm)
- High protection class IP 42
- Orbital diameter 4.5 mm

C.7. Universal furnace from Carbolite (Model CWF 1100)

MAIN PARAMETERS	
Model CWF (volume)	13 liters
Max Temp (°C)	1100
Max Power (watts)	3100
Holding Power (watts)	1300
Nominal Heat Up Time (min)	55
Temperature Sensor	Type K thermocouple

C.8. Binder Microbiological Incubator (Heating oven, Drying oven)

Temperature data

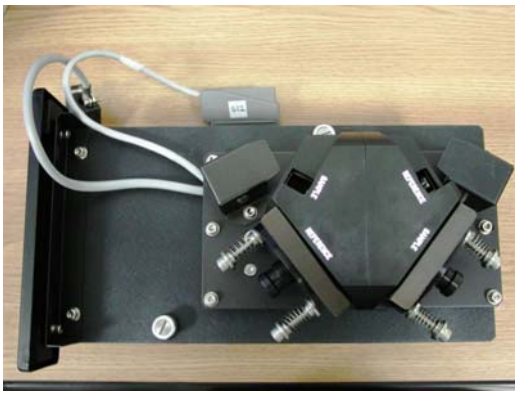
Temperature range (± 0C), 50^{0}C above ambient to		300
Temperature variation (± 0C) at 700^{0}C		0.8
at 1500^{0}C		2
at 3000^{0}C		3.7
Temperature fluctuation (± 0C)		0.3
Heating up time (min) to700^{0}C		7
to 1500^{0}C		22
to 2500^{0}C		45
EQUIPMENT	Microprocessor temperature controller with LED display, timer function and ramp function	
	Temperature safety device cl.2 acc. To DIN 12880 - 1	
	Exhaust duct f 50mm with ventilation slide	
	Rolling feeds with brake	

C.9. Vilber Lourmat UV lamp

Model	Tube(W)	Wavelength(nm)	Intensity at 15 cm (µW/cm2)
VL-115 M	1x15	312	1000

D. Caracterizare

D.1 Cintra 10e Spectrophotometer



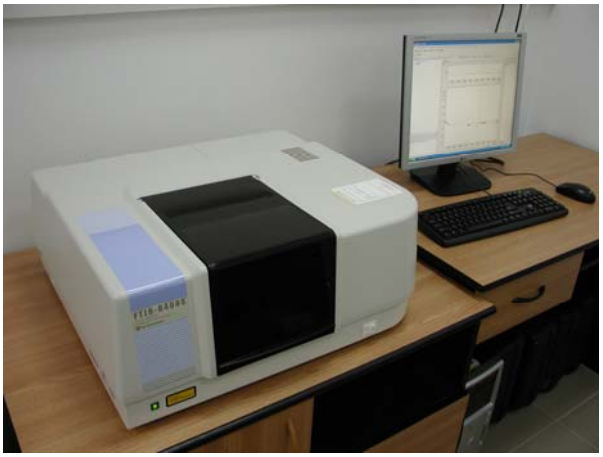
D.2. Optical microscope NU2

Illumination: Hg lamp (HBO 200), Xe lamp (HBO 101), Halogen lamp
Magnification: 8 – 25 X object size
Operation mode:

Transmission	bright field - with plan-chromatic condenser
	bright field – without condenser
	dark field
	phase contrast

	fluorescence
	polarized light
	polarization microscopy
Reflection	bright field
	dark field
	phase contrast
	polarized light
	fluorescence
Transmission + Reflection	

D.3. FTIR Fourier Transformed Infrared Spectroscopy with AIM microscope, Schimadzu



Interferometer	Michelson interferometer (30° incident angle) Dynamic alignment system Sealed and desiccated interferometer
Optical system	Single beam optics
Beam splitter	Germanium-coated KBr plate
Beam source	Ceramic
Detector	High sensitivity pyroelectric detector (DLATGS)
Wavenumber range	7800 cm^{-1} -350 cm^{-1}
Resolution	0.85 cm^{-1},1 cm^{-1},2 cm^{-1},4 cm^{-1},8 cm^{-1}, 16 cm^{-1}
Calculation wavenumber interval	0.25 cm^{-1},0.5 cm^{-1},1 cm^{-1},2 cm^{-1},4 cm^{-1}
Wavenumber accuracy	±0.25 cm^{-1}
S/N ratio	20000:1(Peak-to peak,resolution 4 cm^{-1}, approx.2100 cm^{-1},1minute scanning)
Mirror speed	3-stept selection from 2.8 mm/sec, 5mm/sec,or 9 mm/sec A scanning at 4 cm^{-1} takes from 2-3 sec
Data sampling	He-Ne laser
Gain control	Automatic or manual from x1-x128 in 2^n steps
Sample compartment	200(W)x230(L)x170(H) mm

Dimensions/weight Spectrophotometer unit	620(W)x580(L)x240(H)mm,40kg

D4. HORIBA Jobin Yvon iHR550 Imaging spectrometer + Horiba Jobin Yvon i-Spectrum ICCD detector

Focal length	550 mm
Aperture	f/6.4
Spectral range	150 to 1500 nm w/120g/mm grating, 150 nm to 40 microns w/appropriate gratings
Grating size	76mm X 76mm
Number of gratings on turret	up to 3
Flat field size	30 mm X12 mm
Resolution with Exit Slit and PMT	0.025 nm
Wavelength Accurancy	20 nm
Repeatability	0.075 nm
Spectral Disperssion @500 nm	1.34 nm/mm
Magnification	1.1
Stray light	$1x10^{-5}$
Scan speed	160 nm/s
Step size	0.002 nm
Computer interface	High speed USB
Length	648 mm
Width	460 mm
Height	193 mm
Optical axis (height from bottom of instrument)	98 mm
Nominal weight	28 kg

Intensifier type	18 UVF
Input window	UV grade quartz
intensifier type	Gen II
Photocathode	S20
output window	Fiber optic
Coupling between intensifier and CCD	By taper
Phosphor screen	P43 phosphorus standard
Photocathode diameter	18 mm
Maximum photocathode repetition rate	50 kHz
Spectral range (nm)	180-850
Minimum gate width	5 ns

***D5. Sistem 4-point probe**, format din sonda Jandel, sursa de curent KEITHLEY 6220 si nanovoltmetru KEITHLEY 2182A*

***D6 : sistem RTA** ULVAC, model ULVAC-RIKO MILA-5000*

Type	*Near-infrared lamp high temperature type high vacuum type*
Temperature range	*Room temperature to 1200 C*
Max heating rate	*50 C/s in vacuum* *45 C/s in nitrogen*
Temperature uniformity	*4 C at 1200C in vacuum* *9C at 1200 C in nitrogen*
Heating atmosphere	*In air, vacuum or inert gas*
Sample size	*20W x 20L x 2T (mm)*
Lamp rating	*1kW*

***D7: masurare effect Hall**, sursa de tensiune KEITHLEY 6487*

***D8: montaj m-line:** pentru testarea sensibilitatii si a raspunsului la gaze toxice, constand dintr-o sursa laser cu He-Ne (λ=632,8 nm), He-Ne Research Electro-Optics (Boulder, Colorado), stabilizata in frecventa, o prisma optica de TiO_2-rutile cu indice mare de refractie (**n_{TE} =2,8641, n_{TM} = 2,5821@** 632,8 nm) pentru introducerea si extragerea luminii din ghid/film, iar ca detector o fotodioda cu Si-Hamamatsu.*

Anexa 2 : INCDFM

Infrastructura de cercetare (la nivel national si european/international): – achizitii noi efectuate in ultimii 2 ani (care nu au apucat sa produca inca citari >50, dar au un potential ridicat de a creste calitatea publicatiilor viitoare)

A1. Laboratorul de microscopie electronică de transmisie de înaltă rezolu ie

În acest laborator, achizi□ia noua principală a constat (i) dintr-un microscop electronic de înaltă rezolu□ie (rezolu□ie atomică, 0,8Ångström) de tip Jeol JEM ARM 200F □i (ii) dintr-o instala□ie de prelucrare a probelor în fascicul de ioni focalizat, cu monitorizare prin microscopie electronică de baleiaj (Tescan). A mai fost achizi□ionat □i (iii) un sistem complex de microscopie de baleiaj SPM (AFM, MFM, STM, CFM, EFM, nanoindentare) func□ionând în vid □i la temperatură variabilă (NT-MDT).

A2. Camera curată

Aceasta infrastructură constă (i) dintr-o cameră curată de clasa ISO1000, cu o suprafa□a de 45 m2, unde se află instalată, (ii) o instala□ie de nanolitografie SEM Raith-Hitachi, cu aliniere a probelor prin interferometrie laser, ni□e chimice □i (iii-iv) două instala□ii de metalizare cu multiple celule: evaporare

directă □i din fascicul electronic, una pentru metale necontaminante □i o alta pentru metale contaminante. Într-o altă cameră de clasa ISO 100, cu o suprafa□ă de 15 m2, se află (v) nouă instala□ie de fotolitografie (EV Group).

B1. Laboratorul de tiin a suprafe elor i interfe elor, s-a dezvoltat prin achizi□ionarea:

(i) unei instala□ii de spectroscopie de fotoelectroni cu rezolu□ie unghiulară □i de spin

□i (ii) a unei instala□ii de microscopie de electroni len□i □i de fotoelectroni LEEM-PEEM, ambele produse de Specs. Instala□ia complexă de studiul suprafe□elor □i interfe□elor care a rezultat este printre cele mai complete existente în Uniunea Europeană; în ceea ce prive□te sistemul LEEM-PEEM – până în momentul de fa□ă mai există două astfel de instala□ii în Europa □i cinci în Statele Unite.

B2. Laboratorul de caracterizări complexe ale materialelor din punct de vedere structural

a fost modernizat prin achizi□ionarea (i) unui spectrometru de rezonan□ă electronică paramagnetică (EPR) în pulsuri cu transformată Fourier – instala□ie unicat la nivel na□ional –; (ii) a unui spectrometru Mössbauer cu criostat de heliu lichid, func□ionând în câmp magnetic – de asemenea unicat

– □i (iii) a unui spectrometru de absorb□ie de raze X, care permite efectuarea în INCDFM a unor măsurători care, altfel, ar fi necesitat accesul la facilita□i de radia□ie de sincrotron – în Europa mai există instalat un singur astfel de echipament în momentul de fa□ă.

B3. Laboratorul de studii la frecven e înalte (THz),

pentru care s-a achizi□ionat (i) un analizor de re□ele vectorial Agilent, o cameră anecoică □i (ii) un spectrometru care poate opera până la 7 THz (Aispec Japonia). Ultima dotare men□ionată este unicat la nivel mondial; niciun astfel de spectrometru nu a fost comercializat nici în Statele Unite, nici în Uniunea Europeană, nici în vreo altă economie dezvoltată, cu excep□ia Japoniei. A mai fost achizi□ionat □i (iii) un stand de măsurători de temperatură variabilă pentru probe de dimensiune redusă.

B4. Laboratorul de Optică i Spectroscopie

a fost modernizat prin achizi□ionarea (i) unui spectrofotometru Raman dotat cu microscop □i operand într-o gamă largă de energii de excitare, realizându-se, împreună cu dotările pre-existente, cea mai importantă platformă de măsurători Raman din Estul Europei. De asemenea, s-a mai achizi□ionat □i (ii) un microscop optic de fluorescen□ă în câmp apropiat, cu posibilitatea de lucru la temperatura heliului lichid – instala□ie ce este de asemenea unicat.

A fost achizitionata o instalatie pentru depunerea straturilor Langmuir-Blodgett multiple echipata cu un sistem de termostatare, care permite depuneri de straturi la diferite temperaturi : intre -20 grade C si 80 grade Celsius

B5. Laboratorul de caracterizări complexe electrice i magnetice

a fost completat cu următoarele echipamente: (i) 1 tester pentru straturi sub□iri feroelectrice; (ii) 2 cryoprobere cu bra□e micromanipulatoare pentru studiu materiale feroice si multiferoice ; (iii) un sistem de măsurare a proprietă□ilor fizice PPMS criogenic; (iv) un magnetometru supraconductor cu interferen□ă cuantică SQUID (temperatura minimă 2 K); (v) două sta□ii de lichefiere de heliu, câte una pentru fiecare aripă a clădirilor INCDFM.

Descriere echipamente principale

- Microscop electronic analitic, cu rezolu ie atomică i sistem dual de microscop electronic de baleiaj, cuplat cu prelucrare în fascicule de ioni focalizat (SEM-FIB)Performan□ele acestui echipament complex sunt la cel mai înalt nivel mondial în momentul actual, fiind unice în Europa de Est în momentul de fa□ă. Microscopul electronic JEM ARM 200F (Fig. 1) lucrează la o tensiune maximă de accelerare a fasciculului electronic de 200kV □i este echipat, cu o sursă de electroni cu efect de câmp (Field Emission Gun, FEG) □i corector al abera□iei de sfericitate. Prezen□a corectorului

abera□iei de sfericitate permite ob□inerea unei rezolu□ii spa□iale de 0.08nm în modul de func□ionare STEM (Scanning Transmission Electron Microscopy). Perfoman□a □i complexitatea instrumentului sunt întregite de echiparea cu unită□i analitice EDS (Energy Dispersive X-ray Spectroscopy) □i EELS (Electron Energy Loss Spectroscopy) de ultimă genera□ie, care permit determinări compozi□ionale de înaltă precizie, atât din punct de vedere cantitativ, cât □i spa□ial, mergând până la rezolu□ie spa□ială atomică. Instrumentul poate fi operat în cel pu□in 10 moduri de lucru diferite, cum ar fi: TEM/HRTEM, difrac□ie de electroni pe arie selectată (SAED) sau în fascicul. Pilotarea echipamentului, precum □i achizi□ia □i procesarea datelor se face cu ajutorul unor programe complexe dedicate, instalate pe computerele care deservesc microscopul. În afara accesoriilor care echipează coloana microscopului (EDS, EELS, camera CCD), au fost achizi□ionate □i o serie de dispozitive □i instala□ii de ultimă genera□ie pentru prepararea probelor de microscopie electronică, cea mai complexă instala□ie fiind sistemul dual SEM-FIB Tescan Lyra III XMU. Sistemul SEM-FIB este la rândul lui accesorizat cu echipamente suplimentare care permit efectuarea de investiga□ii structurale (unitate de difrac□ie de electroni retro-împră□tia□i, EBSD) □i compozi□ionale (unitate EDS).

Fig. 1. Microscopul electronic JEM ARM 200 F; Sistemul dual SEM-FIB Tescan Lyra III XMU convergent (CBED); nanodifrac ie de electroni, STEM, EDS în mod spot, profil liniar sau cartografie 2D (rezolu ie spa iala 1 nm); EELS în regim de spectrometrie sau de imagistică filtrată în energie (spectrum image, EFTEM) cu rezolu ie spa ială la nivel atomic.

- Sistem complex de măsurare a proprietă ilor magnetice, electronice i termice ale solidelor, la temperaturi joase i în câmpuri magnetice înalte

Sistemul, prezentat în fig.2, este compus dintr-o instala□ie pentru heliu lichid (QD-LHe-P18-Cryomech (USA) □i din alte două sisteme de măsură: a) sistem pentru măsurători magnetice QD-MPMS-XL-7AC – Quantum Design (USA), care utilizează tehnologia SQUID pentru a realiza sensibilitatea □i reproductibilitatea măsurătorilor magnetice (câmpuri magnetice aplicate până la 7T; domeniu de temperatură 2-400°K; rezolu□ie a varia□iilor de moment magnetic 10-8emu) □i b) sistem de măsurare a proprietă□ilor fizice QD-PPMS-14 – Quantum Design (USA), optimizat pentru a combina magnetometria cu

măsurătorile de capacitate calorică □i electro-transport (câmpul maxim 14T, domeniu de temperatură 2-1000°K).

Fig. 2. Componenta MPMS-SQUID i componenta PPMS

Noile posibilită□i de caracterizare oferite vor deschide oportunită□i suplimentare pentru studierea de noi materiale □i fenomene, cum ar fi antiferomagnetismul □i cuplajul interfacial în sisteme cu dimensionalitate redusă, nanomateriale □i multistraturi, supraconductori, structuri magneto-optice □i magnetorezistive, compu□i moleculari, materiale □i compozite organice cu aplica□ii în electronică, biofizică, magnetochimie □i biologie.

- Cluster experimental pentru tiin a suprafe elor i interfe elor

Clusterul reprezintă una dintre cele mai complexe astfel de instala□ii existente în Europa, permite prepararea □i caracterizarea in situ de suprafe□e □i interfe□e □i consistă din patru unită□i, dintre care primele trei sunt cuplate mutual (fig. 3):

• incinta pentru epitaxie în fascicul molecular (MBE);
• incinta pentru microscopie de baleiaj cu tunelare (STM);
• incinta pentru spectroscopie de fotoelectroni rezolvată în spin □i unghiular (SARPES);
• microscopie electronică fotoemisivă (PEEM) □i cu electroni de energie joasă (LEEM).

Toate dispozitivele operează în ultravid (presiune 1-2x10-10mbar). Men□ionăm că există posibilită□i de caracterizare in situ prin difrac□ie de electroni de energie joasă (LEED), difrac□ie de electroni reflecta□i de energie înaltă (RHEED), spectroscopie cu electroni Auger (AES), spectroscopie de masă quadrupolară (QMS), spectroscopie de fotoelectroni genera□i de radia□ie X (XPS) clasică □i de înaltă rezolu□ie, spectroscopie de fotoelectroni genera□i de radia□ie ultravioletă (UPS) etc.

Fig.3

- Spectrometru de rezonan ă electronică de spin în bandă X cu transformată Fourier

Acest spectrometru (fig. 4) permite măsurători RES în modurile cw (continuous wave) i pulsat. Con ine, de asemenea, i unită i ENDOR i ELDOR, operând în pulsuri pentru experimente multi-rezonan ă. Sistemul permite abordarea speciilor atomice paramagnetice în diverse materiale: semiconductori cristalini i amorfi, izolatori, materiale cu duritate ridicată, sticle, biomolecule, molecule active chimic etc. Echipamentul completează central existent de rezonan ă electronică de spin multifrecven ă al INCDFM. Principalii parametri de operare sunt: (i) domeniul de frecven ă microunde (modul cw): 9,2-9,9GHz; (ii) frecven a centrală în modul pulsat: 9,7GHz; (iii) domeniul de frecven ă RF i puterea (pentru măsurători ENDOR): 100kHz–250MHz, 150W; (iv)

domeniul de câmp magnetic aplicat: 0,03– 1,45 T; (v) sensibilitatea în modul cw: 1,2x109spini/Gauss.

Fig. 4. Spectrometrul cu rezonan ă electronică de spin (RES) în bandă X, cu transformată Fourier, model Bruker BioSpin ELEXSYS 580 10/12

- Echipament de caracterizare a materialelor i dispozitivelor în domeniul microundelor i a undelor milimetrice

Unitatea centrală a echipamentului este Analizorul de Re□ele Vectoriale Agilent PNA-X N5245A (fig.5), echipat cu 4-porturi, sursă dual ă, „combiner“ intern □i comutatoare mecanice, compensator de frecven□ă □i inputuri IF adi□ionale pentru caracterizare de antene □i unde milimetrice. Sistemul permite diferite tipuri de măsurători: (i) parametrii S (mărime □i fază) în domeniul de frecven□ă; (ii) caracterizarea componentelor neliniare; (iii) parametrul X neliniar; (iv) domenii temporale. Unitatea standard operează în domeniul 10MHz–50GHz, dar există dispositive care pot mări intervalul de măsură spre frecven□e mult mai mari (până la 500GHz). Acurate□ea datelor măsurate este asigurată de calibrarea adecvată cu un modul de calibrare electronic coaxial (10MHz–67 GHz).

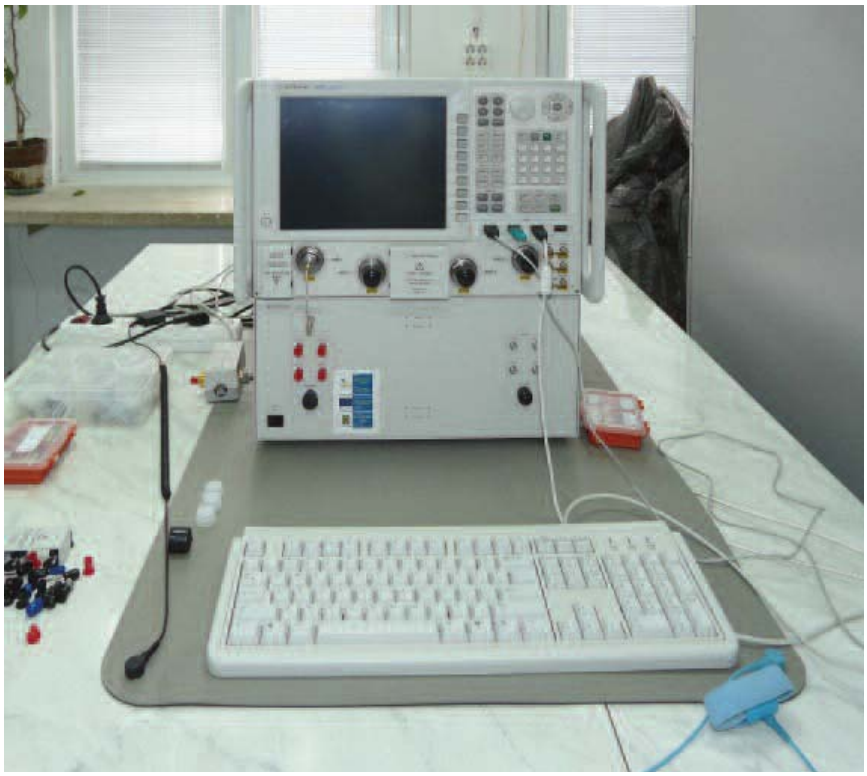


Fig. 5. Analizor de re ele vectoriale Agilent N5245A PNA-X kit de calibrare ghid de undă pentru fiecare bandă de frecven ă a capetelor de unde milimetrice.

Capabilită□ile de măsură ale sistemului permit caracterizarea materialelor neliniare (cum sunt feroelectricii □i multiferoicii) □i a dispozitivelor neliniare. În acela□i context a fost achizi□ionat un spectrometru de microunde până la 7THz Aispec pulse IRS2000 (Fig. 6) pentru caracterizarea materialelor □i structurilor într-o foarte largă bandă de frecven□e 40GHz–7THz. Spectrometrul permite diferite tipuri de măsurători: în transmisie (în domeniul de temperatură de la -180°C pînă la +300°C), în reflexie, în reflexie totală atenuată, în probe lichide □i gazoase. Măsurătorile sunt controlate prin computer, utilizând „Aispec THZEQ Measurement Program“, iar software-ul furnizează datele de material, cum ar fi indexul de refracție complex vs. frecvență, constantă dielectrică, pierderile ielectrice, conductivitatea etc.

Fig. 6. Spectrometrul de microunde în banda de frecven□ă 40 GHz-7THz, Aispec pulse IRS2000

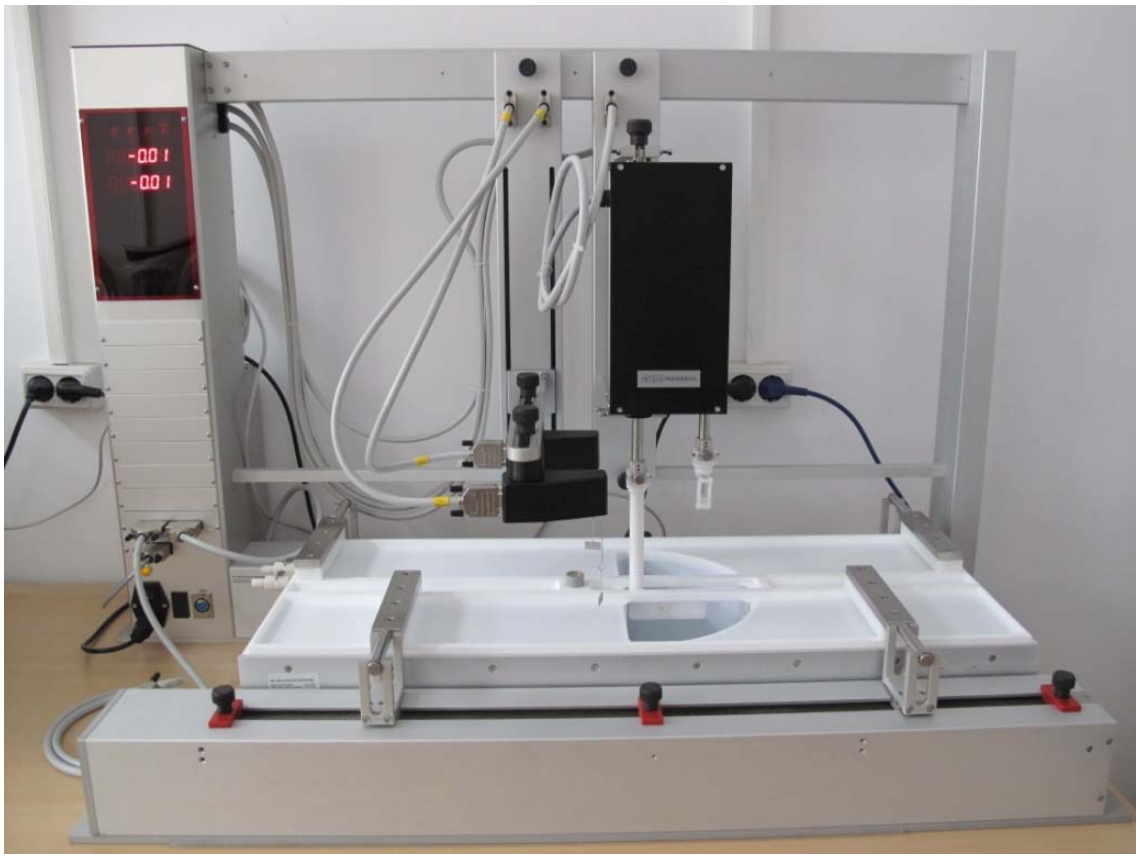


Fig. 7. Sistem pentru prepararea straturilor subtiri multiple, de tip Langmuir-Blodgett cu termostat in intervalul -20 si 80 grade C.

Fig. 8 Sistem Keithley pentru masurari de conductie electrica pe intervale mari de rezistente electrice.

Anexa 3 : INFT - Iasi

Lista echipamente

(1) Instalatii pentru prepararea materialelor magnetice amorfe si nanocristaline prin racire rapida din topitura

(2) Instalatii pentru depuneri de straturi subtiri in vid: *(i) ATC-2200/AJA International, Inc; (ii) Leybold Heraeus Z-400; IEV 80* (instalate in camera curata ISO 5)

(3) Instalatie de sinterizare de tip Spark Plasma Sintering (SPS)-FCT-(FAST) HPD5

(4) Echipamente pentru prepararea de micro si nanopulberi: *(i) Moara planetara RETSCH PM 200 si dispozitiv de sitare RETSCH AS 200; (ii) Dispozitiv de atomizare cu flux de gaz-lichid; (III) Instalatie de descarcare in arc; (IV) Moara de laborator model PULVERISETTE 7 Premium Line cu accesorii*

(5) Echipamente pentru prepararea de materiale nanodimensionate sub forma de nanofire si straturi subtiri prin metode electrochimice: *(i) Biopotentiostat /Galvanostat HEKA PG 340;(ii) Potentiostat Voltalab 10*

(6) Masina de lipit contacte micro si nano, cu accesorii, BALL BONDER HBO4

(7) Aparat de depunere (prin imprastiere) fotorezist

(8) Sistem de corodare cu fascicul de ioni GATAN Dual Ion Mill Model 600

(9) Spectrometru de absorbtie atomica (Perkin - Elmer AAnalyst 200)

(10) Spectrometru in infrarosu cu transformata Fourier (FT-IR JASCO 6100)

(11) Spectrofotometru UV-VIS (Perkin Elmer LAMBDA 35)

(12) Echipament pentru analiza suprafetei materialelor si a porozitatii acestora, inclusiv variatia acestora cu temperatura - CHEMBET 3000 TPR/TPD cu accesorii

(13) Difractometru de raze X (BRUKER AxS D8-Advance) cu modul de temperatura si reflectometrie

(14) Analizor termic diferential TG/DSC NETZSCH STA 409 PC Luxx cuplat cu Spectrometru de masa QMS

(15) Calorimetru diferential SETARAM LABSYS

(16) Microscop de forta atomica Park SYSTEMS XE-100 cu module MFM, EFM, SThM, STYM, I–AFM si nanoindentare

(17) Microscop electronic cu scanare analitica (SEM) echipat cu modul EDS-JEOL JSM 6390 si modul de litografiere cu fascicul de electroni - XENOS XP G2

(18) Microscop electronic cu fascicul dublu focalizat, de ioni (FIB) si electroni (FE-SEM) - CrossBeam System Carl Zeiss NEON40EsB + EDS + EBDS + sistem de depunere *in-situ*

(19) Microscoape optice de inalta rezolutie: *(i) Microscop optic Carl Zeiss AXIO IMAGER MAT Microscope – Axio Imager.A1m (1000 x); (ii) Microscop optic cu reflexie (Carl Zeiss AXIO Observer.D1m Inverse Microscope); (iii) Microscop OPTIKA (800 x); (iv) Microscop OLYMPUS BX51*

(20) Microscop metalografic cu sistem de achizitie si prelucrare imagini

(21) Aparat pentru determinarea grosimii straturilor subtiri Alpha Step IQ

(22) Analizoare pentru determinarea dimensiunii nano si microparticulelor: *(i) Analizor MICROTRAC/ NANOTRAC 252; (ii) Analizor MICROTRAC S3 500*

(23) Reometru Anton Paar MCR 101 (permite studiul lichidelor magnetoreologice)

(24) Echipament de masura a caracteristicilor magnetice de suprafata prin efect Kerr magnetooptic Nano MOKE 2

(25) Magnetometru cu proba vibranta Lake Shore VSM 7410

(26) Sistem de masura a proprietatilor fizice ale materialelor PPMS-9 QD

(27) Histerezisgraf HyMAC cu accesorii (frecvente de lucru intre 30 si 3000 Hz)

(28) Incinta de ecranare electromagnetica

(29) Analizoare de impedanta/retea: *(i) Analizor de impedanta tip AGILENT 4394 A (40-110 MHz); (ii) Analizor RF de impedanta/material tip E 49991 A (1 MHz–3 GHz); (iii) Analizor de retea tip VNA – LN 5230 E (3 GHz – 50 GHz*)

(30) Echipament pentru studiul caracteristicilor dinamice ale senzorilor magnetici

(31) Microtom 5040 pentru realizarea de probe/sectiuni

(32) Aparat SIEVERT pentru studiul cineticii de absorbtie/desorbtie a hidrogenului PCT PRO 2000

(33) Dilatometru LINSEIS L75 VS 1000

(34) Cuptoare pentru tratamente termice in aer, vid si atmosfera controlata

Anexa 4 : UBB

Infrastructura de cercetare (la nivel national si european/international): – achizitii noi efectuate in ultimii ani

Spectrometru RMN / Bruker -Avance 400 MHz

- camp magnetic 9.4 Tesla
- MAS pana la 15kHz

2 capete de sonda pentru probe solide si lichide

Spectrometru RMN / Bruker -Avance 600 MHz

Magnet supraconductor, camp magnetic 14.09 Tesla, diametru operational 54 mm, Consola tip AVANCE, configurata pentru rezonanta dubla, dotata cu doua canale H, X; amplificator canal H – BLARH100 (Putere 100 W), canal X – BLAX300 (300 W); Sonde de analiza:

a. pentru probe solide:
   - de inalta rezolutie, de tip BBI MAS 4mm, dublu rezonant, frecventa de rotatie 15 kHz
   - de inalta rezolutie, de tip BBI MAS 2,5 mm, dublu rezonant, frecventa de rotatie 15 kHz
b. pentru probe lichide:
   - de inalta rezolutie, de tip VSP 5mm, dublu rezonant

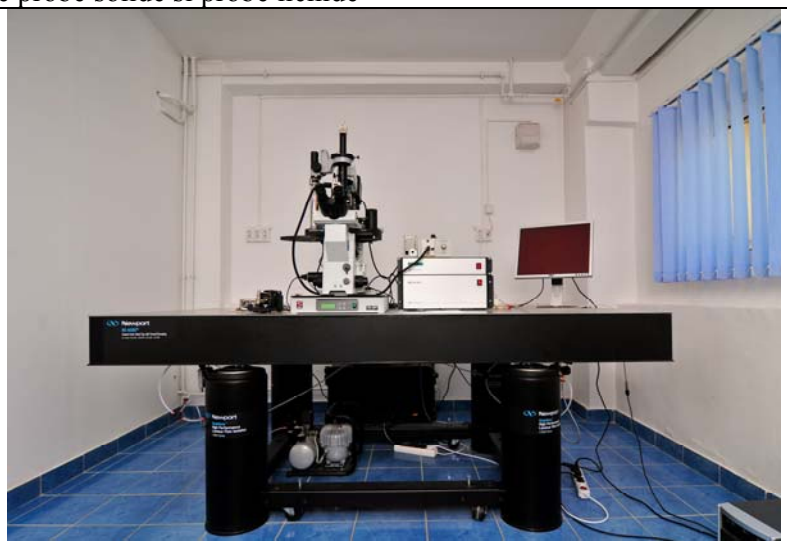
Unitate Pneumatica: controlul automat/ manual al sondelor de analiza a probelor solide a pozitionarii la unghiul magic si a frecventelor de rotatie a port-containerelor probelor.

Spectrometru XPS – SPECS

- Camera de analiza a suprafetelor cu vid ultrainalt (~$2.5*10^{-10}$mbar)
- Analizor PHOIBOS 150 cu detector multicanal (9) – rezolutie ultrainalta – in UPS (<1meV) si XPS (<7meV)
- Surse de raze X: XR 50 – anod Al/Mg
  XR 1000 M- – anod Al/Ag
  Focus 500 – monocromator pentru raze X
- Sursa UV: UVS 10/35 – flux de fotoni de intensitate mare
- Sursa de ioni: IQE 11/35 pentru curatarea suprafetei probei

Spectrometru RES / ADANI

- opereaza in banda X / 9.3 GHz
- inregistrari la temperatura camerei
- masuratori pe probe solide si probe lichide



Platforma microscop NTEGRA Vita - NT-MDT

- dispozitiv specializat pentru aplicatii biologice
- domeniul de temperatura: pana la 60°C (±0.005°C)
- moduri de masurare: Contact AFM, Semicontact AFM, Lateral Force Imaging, Adhesion Force Imaging, Force Modulation Mode, Phase Imaging Mode, AFM Litography

Spectrometru FTIR cuplat cu microscop / Jasco FT/IR-6200

- domeniul spectral: 350-7800 nm
- rezoluție 0.25 cm^{-1}, 45000/1 S/N

Spectrometru de fluorescenta /Jasco – FP-6300

rezolutie: 2.5 nm.
raportul semnal/zgomot pentru banda Raman a apei de la 350 nm este peste 550:1
sursa de excitație: lampă de Xe
domeniul spectral: - excitație: 220 - 750 nm, -emisie:220 - 750 nm

DTA si DSC / Shimadzu

- opereaza simultan masuratori DTA si TG pana la 1600 °C
- viteza de incalzire intre 0.1°C/oră si 50°C/min.
- DSC-60A masoara in intervalul -150 si 600 °C in atmosfera oxidanta sau inerta(oxigen sau azot).

Uscator prin pulverizare / Buchi 290

- se pot obtine particule cu diametrul cuprins intre 1-25 µm folosind pentru spray-ere aer comprimat sau azot (5-8 bar) la temperatura de intrare max. 220 °C.

Difractometru de raze X / Shimadzu 6000

- Sistem cu geometrie Bragg-Bretano cu mod de operare θ/2θ, poate efectua masuratori in transmisie sau reflexie.
- Generator de raze X cu putere maxima de 3 kW.
- Goniometru de tip vertical θ/2θ, pasul minim 0.002° 2θ, 0.0001° θ, domeniu de scanare -6°…..163° 2θ, -180°….180° θ, mod de scanare : θ/2θ, θ, 2θ, viteza de scanare 0.1…50°/min 2θ, 0.05….25°/min θ.

Analizor BET / QSURF M3

- metoda cu un singur punct de analiză si 3 puncte de analiză
- volumul de pori (min. 0,005 cc/g)
- domeniul de măsură: 0,10 - 2000 m^2/g
- precizia măsurătorii: 0,01 m^2/g

3. Cooperare (interna si internationala)

CERN, ELI, FAIR, Elletra Trieste, etc.

Dezvoltarea susținută a domeniilor abordate în cadrul acestei temei **Materiale magnetice: proprietăți şi aplicații în biologie, medicină, IT, comunicații, electronică, energie, mediu şi industria auto** are la bază un număr semnificativ de cooperări interne şi internaționale. Cooperările interne s-au desfăşurat cu predilecție în cadrul Planului Național de Cercetare-Dezvoltare şi Inovare şi includ cooperări între Institutul Național de Cercetare-Dezvoltare pentru Fizică Tehnică – IFT Iaşi şi al□i actori (institute, universități, companii, spitale, organizații) cu o activitate importantă în domeniul materialelor magnetice, în domenii conexe, sau în domeniile în care aceste materiale se aplică, cum sunt:

- Institutul Național de Cercetare-Dezvoltare pentru Fizica Materialelor – INCDFM Bucureşti;
- Institutul Național de Cercetare-Dezvoltare pentru Tehnologii Criogenice şi Izotopice - ICSI Râmnicu Vâlcea;
- Institutul Național de Cercetare-Dezvoltare pentru Mecatronică şi Tehnica Măsurării – INCDMTM Bucureşti;
- Institutul de Fizică Atomică – IFA Bucureşti;
- Institutul Național de Informare şi Documentare – INID Bucureşti;
- Institutul de Chimie Macromoleculară „Petru Poni" Iaşi;
- Universitatea „Alexandru Ioan Cuza" Iaşi;
- Universitatea Tehnică „Gheorghe Asachi" Iaşi;
- Universitatea din Piteşti;
- Universitatea de Medicină şi Farmacie „Gr. T. Popa" Iaşi;
- Universitatea Tehnică din Cluj-Napoca;
- Universitatea „Ovidius" Constanța;
- Universitatea „Transilvania" din Braşov;
- Universitatea Politehnică Bucureşti;
- S.C. Institutul de Cercetări pentru Acoperiri Avansate - ICCA S.A. Bucureşti;
- Societatea comerciala pentru cercetare, proiectare şi producție de echipamente şi instalații de automatizare - S.C. IPA SA Bucureşti;
- SC Nuclear NDT Research and Services SRL Bucureşti;
- Spitalul Clinic Județean de Urgențe „Sf. Spiridon" Iaşi;
- Spitalul Clinic de Recuperare Iaşi, Clinica O.R.L.;
- Asociația Română de Examinări Nedistructive (AROEND), Bucureşti.

Cooperările internaționale s-au derulat în cadrul unor proiecte din Programele Cadru ale U.E. la care Institutul Național de Cercetare-Dezvoltare pentru Fizică Tehnică - IFT Iaşi a participat şi totodată în cadrul unor programe de cooperare bilaterală. În tabelul de mai jos sunt listate detaliile unor proiecte de colaborare recente.

În cadrul proiectelor listate în tabel, dar şi în afara acestora, IFT Iaşi a avut cooperări internaţionale în domeniul temei (materiale magnetice şi aplicaţiile acestora) cu un număr important de universităţi, institute, companii, cum ar fi:

- Technische Universität Kaiserslautern, Germania;
- Université Paris-Sud, Franta;
- Imperial College London, Marea Britanie;
- Instituto de Engenharia de Sistemas e Computadores Microsistemas e Nanotecnologias -
  (INESC – MN), Lisabona, Portugalia;

- Universität Konstanz, Germania;
- Centre National de la Recherche Scientifique (CNRS), Franţa;
- Interuniversitaire Micro-Electronica Centrum vzw (IMEC), Leuven, Belgia;
- AGH University of Science and Technology, Krakow, Polonia;
- Siemens AG, Corporate Technology, Erlangen, Germania;
- Spintec, Grenoble, Franţa;
- University of Glasgow, Marea Britanie;
- University of Salamanca, Spania;
- Adam Mickiewicz University, Poznan, Polonia;
- Thales Research Technology, Palaiseau, Franţa;
- Universitatea din Ljubljana, Slovenia;
- College of Engineering, Michigan State University, S.U.A.;
- Naval Research Lab., S.U.A.;
- COILCRAFT Inc., S.U.A.;
- Methode Electronics, Inc., USA;
- NDI Europe GmbH, Germania;
- Neurosensors Laboratory, Singapore.

Nr. crt.	**Program**	**Titlul proiectului**	**Perioada**
1.	*Marie Curie Research Training Network* Contract no.: *MRTN-CT-2006-035327*	"Spin Current Induced Ultrafast Switching" - SPINSWITCH	2006-2010
2.	*„Coordination Action" (CA)* în cadrul *Priorităţii 3 „Nanotechnologies and Nanosciences"* Contract nr.: *NMP4-CT-2005-013968*	„Improving the Understanding of the Impact of Nanoparicles on Human Health and the Environment" - IMPART	2005-2008
3.	*"Specific Targeted Research or Innovation" Project (STREP)* în	"Magnetoelastic Energy Systems for	2004-2007

	cadrul *Priorității 4 "Aeronautics and Space"* Contract nr.: *AST3-CT-2003-502915*	even more Electric Aircraft" – MESEMA	
4.	*„Specific Support Action Project (SSA)* în cadrul *Programului "Integrating and Strengthning the European Research Area", Prioritatea 3, Identifier: FP6-2003-ACC-SSA-General* Contract nr.: *INCO-CT-2003-510363*	"Network for Nanostructured Materials of Associate Candidate Countries (ACC)" – NENAMAT	2004-2006
5.	FP 5 / Access to Research Infrastructure action of the Improving Human Potential Programme (Contract nr. HPRI-CT-1999-00061)	"New bulk amorphous materials with soft and hard magnetic properties"	1999-2001
6.	Proiect de cooperare bilaterală Romania - Franța	Materiale nanocristaline magnetic dure pe baza de FePt, obtinute din precursori amorfi	2009-2010
7.	Proiect de cooperare bilaterală Romania - Ungaria	Structuri multistrat cu proprietati GMR pentru aplicații biomedicale	2006-2008
8.	Proiect de cooperare bilaterală ELVEȚIA – EUROPA de EST	"Low Electrostatic Silicon – on – Sapphire RF Switches for Telecom Applications - ESSOS"	2000-2004
9.	Proiect de cooperare bilaterala Romania – Italia in cadrul Protocolului celei de a XIV-a sesiuni a Comisiei mixta romano - italiene pentru cooperare	„Noi materiale amorfe masive, cu proprietati magnetice moi si dure. Caracterizarea microstructurala si	2001-2002

	stiintifica si tehnologica	magnetica si legatura cu aplicatiile lor”	
10.	Bilateral (international) scientific and technological cooperation BELGIA – ROMANIA	“Structural and magnetic characterization of amorphous and nanocrystalline magnetic materials”	1999-2001