



Europass Curriculum Vitae

Personal information

First name(s) / Surname(s) **Doina CRACIUN**
E-mail doinacraciun03@hotmail.com
Nationality Romanian
Gender Female

Desired employment / Occupational field

Work experience

Dates	2004 to date
Occupation or position held	Senior research scientist 1-st degree
Name and address of employer	National Institute for Lasers, Plasma, and Radiation Physics (INFLPR), Atomistilor Street, No. 409 PO Box MG-36, 077125, Magurele, Ilfov, Romania; Tel: +40-21 457 44 89, Fax: +40 (0) 21 457 42 43, 457 44 67
Type of business or sector	Research activity
Dates	2000-2003
Occupation or position held	Senior research scientist 2-nd degree
Name and address of employer	National Institute for Lasers, Plasma, and Radiation Physics (INFLPR), Atomistilor Street, No. 409 PO Box MG-36, 077125, Magurele, Ilfov, Romania; Tel: +40-21 457 44 89, Fax: +40 (0) 21 457 42 43, 457 44 67
Type of business or sector	Research activity
Dates	1997- 1999
Occupation or position held	Senior research scientist 3-rd degree
Name and address of employer	National Institute for Lasers, Plasma, and Radiation Physics (INFLPR), Atomistilor Street, No. 409 PO Box MG-36, 077125, Magurele, Ilfov, Romania; Tel: +40-21 457 44 89, Fax: +40 (0) 21 457 42 43, 457 44 67
Type of business or sector	Research activity
Dates	1995-1996
Occupation or position held	Working stage
Name and address of employer	University of Orleans, GREMI, France
Type of business or sector	Research activity
Dates	1991-1994
Occupation or position held	Working stage
Name and address of employer	University College London
Type of business or sector	Research activity
Dates	1979-1990
Occupation or position held	Research scientist
Name and address of employer	National Institute for Lasers, Plasma, and Radiation Physics (INFLPR), Atomistilor Street, No. 409 PO Box MG-36, 077125, Magurele, Ilfov, Romania; Tel: +40-21 457 44 89, Fax: +40 (0) 21 457 42 43, 457 44 67
Type of business or sector	Research activity

Education and training

Dates 1996
Title of qualification awarded PhD in Laser Physics

Principal subjects/occupational skills covered | Processing of thin films by laser ablation
 Name and type of organisation providing education and training | Institute of Atomic Physics Bucharest
 Level in national or international classification | PhD
 Dates | 1974-1979
 Title of qualification awarded | BSc in Physics
 Name and type of organisation providing education and training | University of Bucharest, Department of Physics
 Level in national or international classification | BSc

Personal skills and competences

Mother tongue(s) | **Romanian**
 Other language(s)

Self-assessment
 European level (*)

English

French

Understanding				Speaking				Writing	
Listening		Reading		Spoken interaction		Spoken production			
C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user	C1	Proficient user
C2	Proficient user	C2	Proficient user	C2	Proficient user	C2	Proficient user	C2	Proficient user

(*) [Common European Framework of Reference for Languages](#)

Social skills and competences

Since 1990 I was involved in scientific collaborations with groups from Universite de Paris VI-VII (bilateral collaboration NILPRP -Universite de Paris), UK (EU mobility fellowship) and University of Florida (visiting scientist), having access to high performance installations and equipment, data bases and libraries. I also had the opportunity to work, discuss and learn by interacting with several leading scientists that shaped my career and personality. The results that we have recently obtained in the area of very hard thin film deposition have been received with a great deal of interest by the scientific community. I have been working with colleagues from French and US research labs who were interested in performing tests on ZrC, ZrN and TiN films. The obtained scientific results were published in more than 100 articles in ISI-indexed journals and presented at many international conferences, being cited more than 1000 times (Hirsh index=21), thus contributing to the increased visibility of the Romanian science. More than 80% of papers were written in collaboration with foreign co-authors.

Organisational skills and competences

Projects manager (last 11 years)
 -ELI 17/2017-2019
The physics and engineering of fs laser defects incubation
 -STAR 60 / 2013-2016
The science and technology of high emissivity coatings for outer space radiator applications
 -Ideas contract 1498/2011-2014
 PN-II-ID-PCE-2011-3-0407
Investigations of ZrC thin films properties for TRISO nuclear fuel applications
 -Ideas-contract 1408/2008-2011
Superhard ZrC thin films for vacuum electronics applications
 -Grant CNCSIS 108.2/ 2007-2008
Deposition and characterization of thin, amorphous and high-k HfO₂ films grown by pulsed laser deposition;

Technical skills and competences

1. generation and characterization of laser plasmas;
2. interaction of laser radiation - plasma – target;
3. self-aligned synthesis of titanium silicide;
4. thin films photo- processing;

5. oxides and nitrides thin films deposition by direct and reactive laser ablation;
6. characterization of optical, electrical and structural morphology of thin films using specific methods (spectroscopic ellipsometry, X-ray diffraction at grazing incidence and symmetric geometry, X-ray reflectivity, X-ray photoelectron spectroscopy, CV and IV measurements, FTIR, etc.)
7. numerical estimate of the evolution of temperature in laser ablation targets;
8. design, assembly and maintenance of high vacuum instalations;
9. thin films deposition by UVPLD (ultraviolet assisted pulsed laser deposition)

Main research results

1. Deposition of very hard layers and multilayer structures by the PLD (pulsed laser deposition) technique for applications in nuclear engineering and space exploration.

ZrC layers and ZrC/TiN multilayers deposited on Si substrates at a moderate temperature exhibited hardness values in excess of 40 GPa, very good adhesion and excellent wear behaviour. Their nanocrystalline structure was not affected by ion bombardment.

2. Deposition and characterization of low work-function thin film materials.

Thin films of ZrC and LaB6 have been successfully grown using the PLD technique. These films were textured or epitaxial and exhibited excellent mechanical and electronic properties.

3. Ultra-Violet assisted PLD deposition of transparent and conductive oxides (TCO) films.

This new technique allowed for the deposition of very high quality films at substrate temperatures 200-300 oC lower than the usually employed ones.

4. Theoretical estimations of temperature gradients inside targets during laser ablation process and experimental validation of theoretical predictions.

Experimental and theoretical studies regarding the sub-surface and volume boiling for oxide targets such as ZnO, CeO2, PZT, LaSrCoOx, Ca10(PO4)6(OH)2 during high power laser irradiation were performed. Based on these experimental studies, a model to account for liquid droplets emission from targets during laser ablation was developed, which showed that the density number of the ejected droplets is directly linked to the optical absorption coefficient of the target.

5. Photo-processing of thin films.

By performing post deposition UV-assisted annealing treatments at moderate temperatures on thin oxide films, a marked improvement of the structural, compositional, electrical and optical properties of these films was obtained.

6. Deposition of thin nitride films by reactive pulsed laser deposition technique.

A pulsed laser deposition system was designed in our laboratory to investigate the deposition of nitride films using a reactive atmosphere during the laser ablation of pure metallic targets. This was an innovative approach, later adopted by many groups involved in PLD research.

7. Laser self-aligned synthesis of refractory metals silicide.

The synthesis of TiSi2 on a MOS transistor structure using an original technique, entitled laser self-aligned synthesis was proposed and realized: due to the very different thermal conductivity values of Si and SiO2, a blanket Ti film deposited on such a surface will heat up also very differently when irradiated by a ns pulsed laser. Ti in contact with Si will only melt and react forming TiSi2 while Ti in contact with SiO2 will melt and vaporize, being completely removed. There is no need for any masks, photolithographic steps and selective removal, the process being simple and efficient.

8. Investigation of damage accumulation in oxide films used for mirrors during sub-threshold fs-laser irradiation. Optical thin films such as HfO2 and ZrO2 were grown by PLD technique and then irradiated with fs-

lasers. Electron paramagnetic resonance investigations showed that the fs laser irradiation induced new electron defects in the bandgap, which in time results into a sudden destruction of the structure.

9. Generation and characterization of laser plasmas; interaction of laser radiation with plasma and target.

I studied the conditions necessary to obtain the plasma in front of a laser irradiated target, under vacuum or various gases and pressures. I determined the laser plasma threshold and what target and gas atmosphere parameters influence the threshold value. Once the plasma is formed, I showed that it can enhance the energetic transfer from the laser pulse towards the target, increasing the efficiency of the laser treatment process.

Computer skills and competences

Knowledge of Microsoft Office (Word, Excel, Power Point), Origin,

Additional information

Visiting scientist at Universite Paris 6-7, France-December 2000

Visiting scientist at Univ. Paris 6-7, December 2007

Visiting scientist at Univ. Florida: January-May 2008, September – November 2009, March-May 2010.

Mobility grant to Free State University, Bloemfontein, RSA, 2017

Mobility grant to Kochi University of Technology, Japan, 2018

Annexes

List of recent publications (the last five years)

1. **Craciun D**, Vasile BS, Lambers E, Makino H, Craciun V, Microstructural investigations of 800 keV Ar ions irradiated nanocrystalline ZrN thin films, SURFACE ENGINEERING, DOI: 10.1080/02670844.2019.1668677 Early Access: SEP 2019

2. Feldiorean, D; Cristea, D; Tiorean, M; Croitoru C, Gabor C.; Jakab-Farkas L, Cunha L, Barradas NP, Alves E, Craciun V, Marin A, Moura C, Leme J, Socol M, **Craciun D**, Cosnita M, Munteanu D, *Deposition temperature influence on the wear behaviour of carbon-based coatings deposited on hardened steel*, APPLIED SURFACE SCIENCE 475 (2019) 762-773.

3. Prepelita P, Stavarache I, **Craciun D**, Garoi F, Negrila C, Sbarcea BG, Craciun V, *Rapid thermal annealing for high-quality ITO thin films deposited by radio-frequency magnetron sputtering*, BEILSTEIN JOURNAL OF NANOTECHNOLOGY 10 (2019) 1511-1522.

4. Ou NC, Bock DC, Su XM, **Craciun D**, Craciun V, McElwee-White L, *Growth of WOx from Tungsten(VI) Oxo-Fluoroalkoxide Complexes with Partially Fluorinated beta-Diketonate/beta-Ketoesterate Ligands: Comparison of Chemical Vapor Deposition to Aerosol-Assisted CVD*, ACS APPLIED MATERIALS & INTERFACES 11 (2019) 28180-28188.

5. Mihai MD, Ionescu P, Pantelica D, Petrascu H, **Craciun D**, Craciun V, Vasiliu F, Vasile BS, Mercioniu I, *Annealing of preexisting defects in silicon single crystals by ion irradiation*, NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS 450 (2019) 85-89.

6. Dorcioman G, Fufa O, Craciun V, Miroiu M, Garoi P, Axente E, Sima F, **Craciun D**, *Investigations of thin titanium oxide films grown by reactive pulsed laser deposition*, ROMANIAN JOURNAL OF ORAL REHABILITATION 10 (2018) 41-49.

7. Vasile BS, **Craciun D**, Ionescu P, Pantelica D, Dorcioman G, Craciun V, *Microstructure of 800 keV Ar ion irradiated thin ZrC films*, APPLIED SURFACE SCIENCE 442 (2018) 773-777.

8. Vasile BS, Ben Daly A, **Craciun D**, Alexandrou I, Lazar S, Lemaitre A, Maaref MA, Iacomi F, Craciun V, *Structural and physical properties of InAlAs quantum dots grown on GaAs*, PHYSICA B-CONDENSED MATTER 535 (2018): 262-267.

9. Floroian L, **Craciun D**, Socol G, Dorcioman G, Socol M, Badea M, Craciun V, *Titanium implants' surface functionalization by pulsed laser deposition of TiN, ZrC and ZrN hard films*, APPLIED SURFACE SCIENCE 417 (2017) 175-182.

10. Prepelita P, Filipescu M, Stavarache I, Garoi F, **Craciun D**, *Transparent thin films of indium tin oxide: Morphology-optical*

- investigations, inter dependence analyzes, APPLIED SURFACE SCIENCE 424 (2017) 368-373.
11. Martin C, Miller KH, Makino H, **Craciun D**, Simeone D, Craciun V, *Optical properties of Ar ions irradiated nanocrystalline ZrC and ZrN thin films*, JOURNAL OF NUCLEAR MATERIALS 488 (2017) 16-21.
 12. **Craciun D**, Craciun V, *Pulsed laser deposition of HfO₂ thin films on indium zinc oxide: Band offsets measurements*, APPLIED SURFACE SCIENCE 400 (2017) 77-80.
 13. Popescu C, Cristea D, Bitu B, Cristescu R, **Craciun D**, Chioibasu GD, Luculescu C, Paun I, Duta L, Popescu AC, *An Experimental Study on Nano-Carbon Films as an Anti-Wear Protection for Drilling Tools*, COATINGS 7 (2017) Article Number: 228.
 14. Ben Daly A, **Craciun D**, Ursu EL, Lemaitre A, Maaref MA, Iacomi F, Vasile BS, Craciun V, *Optical and structural properties in type-II InAlAs/AlGaAs quantum dots observed by photoluminescence, X-ray diffraction and transmission electron microscopy*, SUPERLATTICES AND MICROSTRUCTURES 110 (2017) 1-9.
 15. Craciun V, **Craciun D**, Socol G, Behdad S, Boesl B., Himcinschi C, Makino H, Socol, M; Simeone, D, *Investigations of Ar ion irradiation effects on nanocrystalline SiC thin films*, APPLIED SURFACE SCIENCE 374 (2016) 339-345.
 16. Craciun V, Cristea D, Socol G, Lambers E, Trusca R, Fairchild S, Back T, Gruen G, **Craciun D**, *Characteristics of LaB₆ thin films grown by pulsed laser deposition*, JOURNAL OF VACUUM SCIENCE & TECHNOLOGY A 34 (2016) Article Number: 051509.
 17. **Craciun D**, Socol G, Simeone D, Behdad S, Boesl B, Vasile BS, Craciun V, *Structural and mechanical properties changes induced in nanocrystalline ZrC thin films by Ar ion irradiation*, JOURNAL OF NUCLEAR MATERIALS 468 (2016) 78-83.
 18. **Craciun D**, Socol G, Le Caer S, Trinca LM, Galca AC, Pantelica D, Ionescu P, Craciun V, *Gamma irradiation effects on the properties of indium zinc oxide thin films*, THIN SOLID FILMS 614 (2016) 2-6.
 19. Miroiu FM, Stefan N, Visan AI, Nita C, Luculescu CR, Rasoga O, Socol M, Zgura I, Cristescu R, **Craciun D**, Socol G, *Composite biodegradable biopolymer coatings of silk fibroin - Poly(3-hydroxybutyric-acid-co-3-hydroxyvaleric-acid) for biomedical applications*, APPLIED SURFACE SCIENCE 355 (2015) 1123-1131.
 20. **Craciun D**, Socol G, Lambers E, McCumiskey EJ, Taylor CR, Martin C, Argibay N, Tanner DB, Craciun V, *Optical and mechanical properties of nanocrystalline ZrC thin films grown by pulsed laser deposition*, APPLIED SURFACE SCIENCE 352 (2015) 28-32.
 21. **Craciun D**, Socol G, Dorcioman G, Simeone D, Gosset D, Behdad S, Boesl B, Craciun V, *Ar ions irradiation effects in ZrN thin films grown by pulsed laser deposition*, APPLIED SURFACE SCIENCE, 336 (2015) Pages: 129-132.
 22. Cristea D, Patru M, Crisan A, Munteanu D, **Craciun D**, Barradas NP, Alves E, Apreutesei M, Moura C, Cunha L, *Composition and structure variation for magnetron sputtered tantalum oxynitride thin films, as function of deposition parameters*, APPLIED SURFACE SCIENCE 358 (2015) 508-517.
 23. Popescu-Pelin G, **Craciun D**, Socol G, Cristea D, Floroian L, Badea M, Socol M, Craciun V, *Investigations of pulsed laser deposited tin thin films for titanium implants*, ROMANIAN REPORTS IN PHYSICS 67 (2015): 1491-1502.
 24. **Craciun D**, Socol G, Cristea DV, Stoicanescu M, Olah N, Balazs K, Stefan N, Lambers E, Craciun V, *Mechanical properties of pulsed laser deposited nanocrystalline SiC films*, APPLIED SURFACE SCIENCE 336 (2015) 391-395.
 25. **Craciun D**, Popescu AC, Cristea D, Stoicanescu M, Milos I, Lambers E, Socol G, Craciun V, *Hard TiC films grown by pulsed laser deposition*, MATERIALS TODAY-PROCEEDINGS 2 (2015) 3790-3796.

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