

Cercetarea științifică 2009-2013

Departamentul *Știința și Ingineria Materialelor* pregătește specialiști capabili să facă față problemelor tehnice complexe ale prezentului precum și la cele mult mai ample ale viitorului. Cadrele didactice sunt grupate în centre de cercetare și studenții sunt educați în sensul direcțiilor de dezvoltare recunoscute la nivel mondial:

- **valorificarea superioară a materialelor clasice și identificarea și dezvoltarea de materiale noi**, performante, fiabile și ieftine, adaptate diverselor ramuri ale industriilor: spațială, aeronautica, constructoare de mașini, a bunurilor de larg consum, a tehnologiilor și transportului informației etc.
- **dezvoltarea de noi tehnologii performante de producere a materialelor**, care să valorifice în cel mai înalt grad materiile prime și resursele existente în țară;
- **dezvoltarea tehnologii noi, neenergofage și nepoluante, a tehnologiilor de reciclare** care să utilizeze ca materii prime resturi și deșeuri industriale sau casnice, produse pe scară din ce în ce mai largă de societățile dezvoltate;

În departamentul *Știința și Ingineria Materialelor* cercetarea se desfășoară pe 4 direcții de cercetare ce cuprind teme de cercetare de interes pentru cercetarea științifică dar și pentru mediul de afaceri.

1. Obținerea, procesarea și caracterizarea materialelor metalice clasice.

- Procese fizico-chimice și termodinamice în sisteme binare, ternare, multicomponente de elaborare a metalelor și aliajelor.
- Mecanismul și cinetica transformărilor în stare solidă la procesarea materialelor clasice.
- Procese fizico-chimice și metalurgice specifice ingineriei suprafețelor în cazul materialelor metalice clasice.
- Elucidarea transformărilor de fază în procesarea materialelor și stabilirea corelației compoziție chimică-structură- proprietăți de utilizare.
- Dezvoltarea de tehnologii performante de procesare a materialelor metalice clasice de: elaborare, turnare, deformare plastică și tratamente termice și termochimice

2. Obținerea, procesarea și caracterizarea materialelor avansate.

- Procese fizico-chimice și termodinamice în sisteme binare, ternare, multicomponente de elaborare a aliajelor cu proprietăți speciale.
- Mecanismul și cinetica transformărilor în stare solidă la procesarea materialelor avansate.

- Obținerea de noi materiale: metalice cu destinație specială, compozite cu matrice metalică, monocristale, materiale micro și nanostructurate, materiale ceramice oxidice semiconductoare cu proprietăți magnetice, optice și electrice.
- Acoperiri în micro și nano-dimensiune cu metale, aliaje, polimeri, compozite.
- Tribocoroziunea și biocoroziunea materialelor și a straturilor de protecție.
- Procese fizico-chimice și metalurgice de ingineria suprafețelor.
- Dezvoltarea de tehnologii performante de procesare a materialelor cu proprietăți speciale: elaborare, turnare, deformare plastică și tratamente termice și termochimice.

3. Informatică aplicată în ingineria materialelor

- Modelarea proceselor și a sistemelor specifice ingineriei materialelor în scopul eficientizării
- Utilizarea sistemelor informatice de proiectare a materialelor și tehnologiilor din ingineria materialelor și de prelucrare și gestiune a datelor.
- Proiectarea asistată de calculator a tehnologiilor de obținere și de procesare a materialelor în conformitate cu normele de calitate, mediu și de securitate a muncii
- Analiza, caracterizarea și utilizarea materialelor pe baza metodelor experimentale de laborator și industriale

4. Tehnologii noi de fabricație a unor materiale și produse cu valoare adăugată ridicată având în vedere dezvoltarea durabilă a industriei românești în concordanță cu normele europene de mediu și securitate în industrie.

- Elaborarea de strategii de marketing și de management organizațional în ingineria materialelor
- Reduceri a consumurilor de materiale și energie în procesele și sistemele specifice ingineriei materialelor având în vedere creșterea siguranței în funcționare a utilajelor și echipamentelor.
- Cercetări în domeniul ingineriei materialelor cu privire la disiparea poluanților gazoși și a pulberilor din zonele limitrofe platformelor industriale și măsurile care se impun pentru reabilitarea mediului inconjurător
- Proiectarea unor instalații pentru captarea și reținerea pulberilor rezultate de la producerea materialelor și prelucrarea datelor culese prin utilizarea unor metodologii avansate, bazate pe modele fizice, chimice și matematice.
- Analize și tehnologii pentru protecția mediului în ingineria procesării materialelor

Activitatea de cercetare se regăsește în programele de cercetare ale Centrelor de Cercetare din facultate, respectiv la Centrul de nanostructuri și materiale funcționale (CNMF) <http://www.cnmf.ugal.ro>, Centrul de Cercetare Calitatea Materialelor și a Mediului (CCMM) <http://fimm.ugal.ro/cmm/index.php>, Centrul de Competențe: Interfețe – Tribocoroziune și Sisteme Electrochimice (CC-ITES) <http://www.cc-ites.ugal.ro>.

Tema de cercetare 1.

Obținerea, procesarea și caracterizarea materialelor metalice clasice.

Lucrări tiințifice publicate

1. Articole tiințifice publicate in extenso în reviste cotate ISI Web of Science cu factor de impact

1. Marian-Iulian Neacsu, Elena Drugescu, Marian Bordei, *Studies and researches on the influence of chemical composition and natural ageing time on the mechanical properties of some alloys belonging to the Al-Zn-Mg-u system*, **Metalurgia International**, Editura tiințifică F.M.R, Bucureti, ISSN 1582-2214, Nr.10/2012, pp. 125-129.
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3. Mariana Ivan Marcela Muntean Florentina Potecau– *Special refractory masses for application in the iron and steel making area*, **Romanian Journal of Materials**, 2012, 42 (1), pp. 61-68.
4. Dorohoi, D.O., Dascalu, C.F., Teslaru, T., Gheorghies, L.V., *Electronic absorption spectra of two 3-Aryl-pyridazinium-2,4,6-picryl- benzoyl-methylids*, **Spectroscopy Letters** 45 (6) , 2012, pp. 383-391.
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6. Florentina Potecau, Octavian Potecau, *The evolution in time of the drawing sheets quality*, **Metalurgia International**, Editura Stiintifică F.M.R., Bucureti, ISSN 1582 – 2214, vol. XIV (2010), no. 3, pp.31 – 35.
7. E. Vasilescu, *Experimental researches concerning the oxidation resistance of steels for certain ship plates*, **Metalurgia Internațional**, Editura Stiintifică F.M.R, Bucureti, ISSN 1582-2214, vol.XV (2010), no.8, pp. 43-48.
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9. E. Vasilescu, *Researches regarding the influence of intercritical treatments of the mechanical properties of the rolling flat steel products*, **Metalurgia Internațional**, Editura Stiintifică F.M.R, ISSN 1582-2214, vol.XV (2010), no.9, pp.60-65.
10. Carmen Penelopi Papadatu, Marian Bordei, *Changes in tribological behaviour of thermo-chemical treated steels after*, **Metalurgia International**, Editura tiințifică F.M.R., Bucureti, ISSN 1582-2214, Nr.8/2010, pp. 81-85.
11. Tiberiu Potecau¹, Octavian Potecau¹, Rui Jorge Cordeiro Şilva², *Straps of high resistance processed of steel with low carbone*, **Metalurgia International**, Editura Stiintifică F.M.R., Bucureti, ISSN 1582 – 2214, vol. XIV (2010), no. 4, pp.50-54.
12. I.Vasilescu, E.Vasilescu, A. Doniga, *Researches regarding the influence of controlled rolling on the structure and properties of the shipbuilding plates steel*, **Metalurgia International**, Editura tiințifică F.M.R., Bucureti, Nr.2/2009, ISSN 1582-2214, pp. 26-30.
13. E. Vasilescu, A. Doniga, V.O. Rindasu, *Influence of the thermomechanical treatments on the properties of steel plates for welded constructions*, **Metalurgia International**, Bucureti, Editura tiințifică F.M.R., ISSN 1582-2214, Nr.3 special/2009, pp.75-79.
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15. Florentina Potecasu, Anisoara Ciocan, Tamara RADU, *Sea water corroşion associated with weld for critical interface of the aluminium bronze clad steel castings*, **Metalurgia International**, Editura tiințifică F.M.R., Bucureti, ISSN 1582 – 2214, vol. XIV (2009), Special Issue No.11, pp. 61 – 65.

16. Anisoara Ciocan, Florentina Potecasu, *High hardness antifriction aluminium bronzes for wear layer of the steel bearings for drilling equipments*, Metalurgia International, Editura tiințifică F.M.R., Bucureti, ISSN 1582 – 2214, vol. XIV (2009), Special Issue No.11, pp. 34 – 38.

2. Articole tiințifice publicate in extenso in proceeding-urile conferințelor internaționale indexate IşI web of Knowledge

1. Alexa, A. Ciocan, T. Radu, F. Potecasu, *Microalloying of the zinc for obtaining masteralloys or correction of the chemical composition for the Zn baths in the galvanizing process*, **Materials Science Forum**, Trans Tech, Advanced Materials Forum VI, doi:10.4028/www.scientific.net/MSF.730-732.823 on-line available at www.scientific.net since November, 2012, ISSN 0255 – 5476, Vols. 730-732 (2013) pp. 823-828. (<http://www.scientific.net/MSF.730-732.823>)
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3. Ciocan, Florentina Potecasu, F. Potecasu, E. Drugescu, S.Constantinescu, *Characterization of the diffusion zone developed in a bimetallic steel-bronze at interface*, **Materials Science Forum**, Advanced Materials Forum ISSN 0255 – 5476, Trans Tech Publications Ltd Switzerland, UK, USA III, 2010, p 556 – 563 <http://www.scientific.net/10.4028/www.scientific.net/MSF.636637.556>.DOI, 10.4028/www.scientific.net/MSF.636-637.556. Citation, A. Ciocan et al., 2010, Materials Science Forum, 636-637, 556. Online Since, January, 2010)

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1. Florentina Potecaşu, T. Radu, O. Potecaşu, M. Marin, A. Ciocan, *Surface treatment of iron- based sintered compacts for corrosion protection*, METAL 2012, 23-25. May 2012, 21st International Conference on Metallurgy and Materials, May 23rd- 25th 2012 Brno, Czech Republic; EU, Proceeding on CD, ISBN 978-80-87294-29-1;
2. T. Radu, A. Ciocan, Florentina Potecasu, L. Balint, *Obtaining and characterizing Zn-Al-Bi coatings on steel band*, METAL 2012, 21st International Conference on Metallurgy and Materials, May 23rd- 25th 2012 Brno, Czech Republic; EU, Proceeding on CD, ISBN 978-80-87294-29-1
3. Diaconu Nicolae, Deleanu Lorena, Potecasu Florentina, Ciortan Sorin, *The influence of the relative sliding on the surface quality* - International Conference On Tribology, SERBIATRIB –Proceedings - Tribometry -, ISBN 978-86-86663-74-02011, pp. 386-391. <http://www.serbiatrib.mfkg.rs/proceedings.html>
4. Gheorghe Gurau, Carmela Gurau, Nicolae Cananau, Florentina Potecasu - *Influence of ecap passes on spd process parameters and material properties*, Ugalmat 2011, October 21-22, [International Conference On Advanced Technologies And Materials](http://www.castingarea.com/events/events2011.htm), pp. 141-148. <http://www.castingarea.com/events/events2011.htm>;
5. E. Vasilescu; M. Neacsu; E. Drugescu, *Researches concerning the influence of heat treatment on physical and mechanical properties of aluminium based alloys*, New Technologies And Machine Manufacturing Technology Journal, Editura Universităţii "Stefan cel Mare" Suceava, ISSN-1224-029X, pp.17-21;
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7. E. Vasilescu, *Intercritical thermomechanical treatments of the rolling flat steel products for welded pipelines*, BRAMAT, Buletinul Universitatii Transilvania din Brasov, vol.,pag., 2009;
8. E. Vasilescu, *Roles of microalloying elements in steel products for advanced applications*, 2ndInternational Conference Super-high strength steels, 17-20 october 2010, Peschiera del Garda, Italy;
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10. V.G. Vaşilescu; E. Vaşilescu, *Biological environment behavior and corrosion characteristics of some alloys (Cr-Co, Cr-Ni) for dentistry*, JUNIOR EUROMAT 2010, 26-30 july 2010, Lausanne (CH);

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12. A Ivanescu, A.Doniga, L. Ivanescu, E.Vasilescu, S.Istrate, *Researches of the microalloyed steel purity influence on the heavy plates structure and mechanical characteristics.*, METAL, 18th International Conference on Metallurgy and Materials, Ostrava, Czech Republic, Tanger, spol.sr.o., Ostrava, 2009 ISBN 80-86840-13-1; 23.
13. E. Vasilescu, *Thermomechanical treatments applied to the steel heavy plates*, The 15th International Conference "TEHNOMUS" XV, New Technologies and Products in Machine Manufacturing Technologies, Suceava, Roamnia, Editura Universităţii "Stefan cel Mare" Suceava, 2009, ISBN 973-666-154-7, pp.69.
14. E. Vasilescu, M. Neacsu, *The influence of the thermal and thermomechanical treatments applied to the aluminium based alloys*, The 15th International Conference "TEHNOMUS" XV, New Technologies and Products in Machine Manufacturing Technologies, Suceava, Roamnia, Editura Universităţii "Stefan cel Mare" Suceava, 2009 pag.86, ISBN 973-666-154-7;
15. L. Gheorghies, *Intermolecular interaction in binary of some cycloimmonium ylids*, **PLCMOS/Wroklaw**, Poland, 2011.
16. L. Gheorghies, *Solvent influence on the vişible electronic spectra of some pyridazinium derivates*, **PLCMOS/Wroklaw**, Poland, 2011.
17. Marian Bordei, Aurel Ciurea, Angela-Eliza Micu, Adrian Micu - *Researches regarding the type of material used for continuous casting machine rolls*, **New Technologies And Products In Machine Manufacturing Technologies** Journal, Editura Universităţii "Stefan cel Mare" Suceava, 2009, ISSN 1224-029X, pp. 237-242.
18. Nelu Cazacu, Liliana Sava, Sorin Dobrovici Adolf Baclea, *Nanostructured surface for low carbon steel uşing thermal activations by yag:nd pulse laser*, International Conference On Material Science And Engineering, BRAMAT 2009, Brasov 26...28 feb. 2009, <http://www.metalurgia.ro/bramat.pdf>, 2009, Editura Matrix Rom Bucuresti, ISSN 1224-029.
19. Adolf Baclea, Nelu Cazacu, Sorin Dobrovici, *Low-alloyed steel (1%cr) behavior over fluidized bed nitriding with ammonia and nitrogen mixture*, International Conference On Material Science And Engineering, Bramat, 2009, Brasov 26...28 feb. 2009, <http://www.metalurgia.ro/bramat.pdf>, 2009, Editura Matrix Rom Bucuresti, ISSN 1224-029.

4. *Articole ştiinţifice publicate in extenso în reviste naţionale (CNCŞIS B+ BDI)*

1. Florentina Potecasu, Marcela Muntean, Mariana Ivan, *the behavior of refractory in interaction with metallurgical slag*, The Annals of "Dunărea De Jos" University of Galaţi. Fascicle IX. Metallurgy And Materials Science, Nr. 4 – 2012, ISSN 1453 – 083X, pp.5-13;
2. Octavian Potecau, Florentina Potecau, *Choosing and uşing rationally the thermic processed steels*, The Annals of "Dunărea De Jos" University of Galaţi. Fascicle IX. Metallurgy And Materials Science nr. 4 – 2012, ISSN 1453 – 083X, pp.51-58;
3. Florentina Potecasu, Octavian Potecasu, Petrica Alexandru, Mihaela Marin *The influence of the deformation degree on the hardening of duralumin processed through solution heat treatment*, Metalurgia 2011, nr.7, pp.53 – 57.
4. Anisoara Ciocan, Florentina Potecau, *Producing bimetal by direct melting of the bronze machining chips into steel supports*, The Annals of "Dunărea De Jos" University of Galaţi. Fascicle IX. Metallurgy And Materials Science, ISSN 1453 –083X, nr.1 (2011), pp.14-19.
5. Florentina Potecau, Octavian Potecau, *The correlation between the cold rolling degree and the mechanical and technological characteristics for sheets of steel with low carbon*, Metalurgia NR.6, ISSN 0461-9579, (2010), pp.16 – 21.
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7. Carmela Gurău, Gheorghe Gurau, Nicolae Cănanău, Florentina Potecasu, Victor Dogaru, FMBraz Fernandes *The temperature effect on aluminium severely deformed by high pressure torşion*, The Annals

- of "Dunărea De Jos" University of Galați. Fascicle IX. Metallurgy And Materials Science, ISSN 1453 – 083X, 2009 nr 2, pp.8-12.
8. Ivanescu, A. Doniga, E. Vașilescu, L. Ivanescu, *Researches regarding the elements loss through the vaporization in elaboration process in LD Converter*, 2009, Metalurgia nr.6/2009, ISSN 0461-9579, pp. 23-30;
 9. Ivanescu, A. Doniga, E. Vasilescu, L. Ivanescu,, *Modelling of the steel kinetic deoxidation with manganese and aluminium*, 2009, Metalurgia nr.6/2009, ISSN 0461-9579, pp. 30-33;
 10. Vașilescu, E. Vașilescu, *Researches regarding the influence of controlled rolling on the structure and properties of the shipbuilding plates steel*, Metalurgia nr.4/2009, Metalurgia nr.2/2009, ISSN 0461-9579, pp. 20-24 și pp. 24-28;
 11. E.Vașilescu; I. Vașilescu; M. Ciuta; M. Neacsu, *Study on the influence of the chemical composition in the thermomechanical processing of the steel products*, The Annals of "Dunărea De Jos" University of Galați. Fascicle IX. Metallurgy And Materials Science Analele Universitatii Dunarea de jos Galati, Fascicula IX Metalurgie și Stiinta Materialelor, vol 1/2009, pp.158;
 12. E.Vașilescu; M. Neacsu; A. Doniga, *Intercritical thermomechanical treatments of the microalloyed steel products for welded structures*, The Annals of "Dunărea De Jos" University of Galați. Fascicle IX. Metallurgy And Materials Science, vol 2/2009, pp.94;
 13. Gheorghies, L. Gheorghies, S. Cortan, V. Păunoiu, A. M. Cantaragiu, C. C Lalau, D.E. Rusu, *Structural analysis of alumina in layer prepared by controled oxidation process*, **The Annals of "Dunărea De Jos" University of Galați. Fascicle IX. Metallurgy And Materials Science**, Fasc. V. year XXVII (XXXII),ISSN 1221- 4566 , pp.319-321.
 14. Gheorghie, L. Gheorghie, V. Atanașiu, *Characterization of materials surface by X-ray reflectivity measurements*, **The Annals of "Dunărea De Jos" University of Galați. Fascicle IX. Metallurgy And Materials Science** , Fasc.VIII, Tribology, 2009 (XV), ISSN 1221-4590.
 15. Stefan Dragomir, Marian Neacsu, Marian Bordei, *Improving of functional parameters for pressure casting machine with high degree of finishing*, **The Annals of "Dunărea De Jos" University of Galați. Fascicle IX. Metallurgy And Materials Science**, 1/2009, ISSN 1453-083 X, pp. 52 -56
 16. Nelu Cazacu, Nicolae Badea, Sorin Dobrovici, *Quality engineering procedures applied to determine the weight of influence of factors on microtrigeneration systems (mcchp)*, AdvanceMaterials and Techonologies UgalMat, International scientific conference, 2009, Editura Galati University Press, acreditata CNCȘIS, cod 281, ISSN 1843-5807, vol.I, pp.513-521.
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28. Papadatu , C.-P., *The possibility to increase the durability of the steels overlapping a magnetic field on the conventional heat treatment before thermo-chemical treatment*”, The Annals of „Dunărea de Jos” University of Galați, Fascicle II, vol. ”Mathematics, Physics, Theoretical Mechanism”,Year III (XXXIV),Issue 2, 2011, ISSN 2067-2071, pp. 175-182.
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Obținerea, procesarea și caracterizarea materialelor avansate.

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Tema de cercetare 4

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