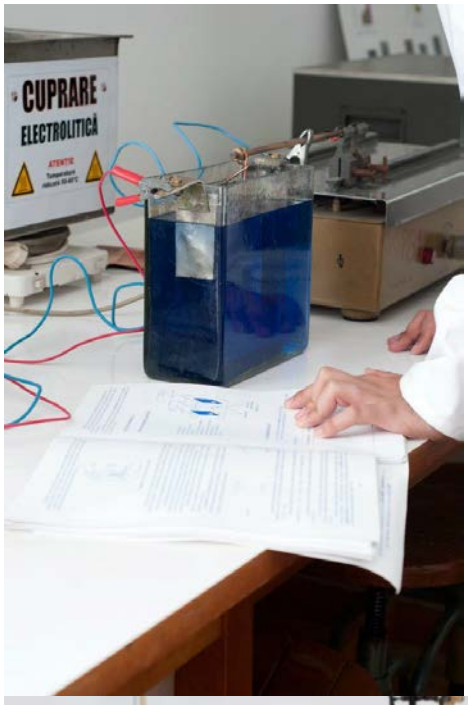
CORROSION AND ANTICORROSION PROTECTION CENTER

Contact details

Name	**Corrosion and Anticorrosion Protection Center**
Acronym	**CAPC**
Logo	
Site	coroziune.utcluj.ro
Address	103-105 Muncii Av., room G09C 400641, Cluj-Napoca, Romania
Faculty Department	**Faculty of Materials and Environmental Engineering** **Environmental Engineering Department**
Telephone	+40 264 401696
Fax	+40 264 415 054
Director	Assoc. Prof. Dr. Eng. Horatiu Vermesan
e-mail	Horatiu.Vermesan@imadd.utcluj.ro



Areas of expertise

Surface Engineering technologies for corrosion protection. Layers that alter the structure and / or chemical composition and deposition of anticorrosion coatings.
Analysis and characterization of surface layers. Characterization of deposit thickness, adhesion, degree of gloss, mechanical properties, tribological properties.
Evaluation of corrosion resistance in artificial atmosphere according to ISO 9227, ISO 10289 and ASTM B117.
Electrochemical methods for the characterization of corrosion through accelerated corrosion tests. Cyclic voltammetry, polarization resistance, impedance spectroscopy

Team

Horațiu Vermeșan Assoc. Prof., PhD. Conducting the course and the laboratory of corrosion and corrosion protection. Publications: 8 books, 60 scientific papers, research internships in Japan (3 years), France, Italy, United Kingdom;
Gavril Negrea Prof. Assist., PhD. Surface altering coating technologies researches to increase resistance to wear and / or corrosion. Publications: 4 books, 58 scientific papers, research internships in the UK and U.S.;
Vasile Rus PhD, Eng. PhD student in Materials Engineering. Field of research: corrosion protection by zincking. PhD thesis on the development of cracks in anti-corrosion layers;

Representative projects

NANOTECH: "**Technology for obtaining anti-corrosion layers by composite nano-particles codeposition",** INNOVATION Project 97/28.09.2007
ZINITECH: "**Innovative technology for production of zinc-nickel alloy layers with anticorrosive properties by co-deposition of composite nano-particles**", INNOVATION Project 261/20.10.2008
"Thermal shock behavior of functional gradient layers deposit on austenitic stainless steels", Grant 944/2005;
"Obtaining, characterization and modeling of thin layers with specific properties" Contract 33385 tema A67, code CNCSIS 404
"Theoretical and experimental research concerning the tribo-corrosion of diffusion layers obtained by surface

engineering technologies", 66-1353-2001.
"The amelioration of wear and corrosion resistance by plastic deformation and plasma nitriding surface hardening" Project 7067-B4.
"Researches concerning the application of DUPLEX technologies to austenitic stainless steels" Project B14 2001
"Researches concerning the influence of oxygen on the structure and properties of nitrided and nitrocarburized layers" Project AT, 3/225 2001
"Nano-crystalline electro-deposits - their processing, character and properties"
EC Research Project, NEPCAP, Contract No G1ST-CT-2002-50211;

Significant results

The most representative publications of the past 5 years:

1. Rus V., Hegyi A., Vermeşan H., Tiuc A. E., Steel reinfocement in fresh concrete, Studia Universitatis Babeş-Bolyai Seria Chemia, vol. LX(60), issue 2, Tom II, pp. 409-419, 2015.
2. Rus V., Hegyi A., Vermeşan H., Elekes I. E., Grünwald E., Electrochemical impedance spectroscopy study on passivated hot dip galvanized reinforcements during the hardening period of fresh concrete, Korróziós Figyelõ, vol. 54, 2, pp. 29-35, 2014.
3. Chira M., Vermeşan H., Rus V., Grunwald E., Corrosion behavior of Zn-Ni coatings electrodeposited in pulsed current and magnetic field on different substrates by electrochemical impedance spectroscopy techniques, Studia Universitatis Babeş-Bolyai, Chemia, vol. LIX, issue 1, pp.63-78, 2014.
4. M. Chira, H. Vermeşan, V. Rus, E. Grunwald, "The electrochemical impedance spectroscopy study of Zn layers corrosion, electrodeposited on different substrates by impulse electroplating and by electrodeposited under magnetic field methods", *Jahrbuch Oberflachen technic*, band 69, 2013, Eugen G. Leuze Verlag, Germania, pp. 259-270
5. M. Chira, H. Vermeşan, V. Rus, E. Grunwald, "The corrosion behaviour of Zn layers, electrodeposited on different substrates, by impulse electroplating and by electrodeposition under magnetic field methods", *Studia Universitatis Babeş-Bolyai, Physica,* vol.2, 2013.
6. Gy. Thalmaier, I.Vida-Simiti, H. Vermeşan, C. Codrean, M. Chira, "Amorphous Ni36Zr35Ti29 alloy as bipolar plates for polymer electrolyte membrane fuel cells", *Optoelectronics and Advanced Materials – Rapid Comunications* Vol. 7, No. 7-8, July - August 2013, p. 573 - 576
7. Gy. Thalmaier, I.Vida-Simiti, H. Vermeşan, C. Codrean, M. Chira, "Corrosion Resistence Measurements of Amorphus Ni40Ti40Nb20", *Advanced Engineering Forum*, Switzerland, 2013.
8. Hegyi, A. , Rus, V. , Bumbuc, C. , Vermeşan, H. "Corrosion of galvanized steel reinforcements in electrolites that simulate the interstitial solution in concrete pores", (2011) *Metalurgia International*, 16 (6), pp. 10-14.
9. Vermesan, H.a , Hirai, N.b , "The use of atomic force microscopy (AFM) in the study of electrochemical phenomena", (2010) *Galvanotechnik*, 101 (4), pp. 718-729.
10. CC Bulea, A. Mate, G. Erno, H. Vermesan, "Co-deposition of zinc-cobalt-chromium three-component alloy with nanoscale silicon dioxide I. Properties of electrolyte" (2010) *Korrozios Figyelo*, 50 (1), pp. 11-15.

Significant solutions:
Estimation of corrosive action of different natural atmospheric environments. Anticorrosive protection of materials in different aggressive climatic conditions: urban, industry, marine, mining etc. Testing of galvanic (contact) corrosion of different metals. Accelerated corrosion testing of protective paint coatings. Investigation of the micro-structural properties of protective coatings: thickness, impact tests, adherence (cross-cut and pull off methods), drawability, elasticity, relative hardness and abrasion. Improving corrosion resistance of hot-dip galvanized coatings. Choice of paints for effective protection of galvanized steel structures;
Products and technologies:
1. Technology for obtaining anti-corrosion layers by composite nano-particles codeposition
2. Technology for obtaining of zinc-nickel alloy layers with anticorrosive properties by co-deposition of composite nano-particles
3. Surface engineering technologies for improving wear resistance of austenitic stainless steels.
4. Nano-crystalline electro-deposits with high anticorrosion properties.
5. Diffusion layers obtained by surface engineering technologies for tribocorrosion applications.

The offer addressed to the economic environment

Research & development	Development of original solutions for protection against corrosion in various environments Security of social infrastructure and security of long service life coated steel sheet Study the fundamental characteristics of corrosion behaviour and utilise this knowledge to develop new technologies and processes to help solve challenging problems and issues. Partner with industry and continue to foster relationships to tackle pressing corrosion and surface related demands affecting our society.
Consulting	Choosing the Surface Engineering technologies for corrosion protection purposes. Research on corrosion behavior of metallic deposits. Study of new layers with anticorrosive properties.
Training	Training courses for engineers in the field of corrosion and corrosion protection. The best available techniques in corrosion protection technologies. Training courses in electrochemical deposition of metals and alloys.