



Laboratory of Applied Metallurgy

Department of Materials Science and Engineering
University of Ioannina

The **Laboratory of Applied Metallurgy** was established in 2004 offering high quality education and research to undergraduate - postgraduate students. It has supported more than 160 Diploma, MSc and PhD Theses. It also collaborates with industry and participates into competitive National and European projects (research and training).

METAL-LAB offers services in the following fields:

- Metallographic and micro - structural studies
- Corrosion - Protection and Advanced Electrochemical studies
- Heat treatment and Surface Engineering
- Evaluation of mechanical properties
- Advanced metallic alloys / composite design and development
- Casting of materials
- Failure analysis
- Material selection

Metallurgy Lab Research and Development Axes

MATERIALS DEVELOPMENT

- TECHNIQUES: Casting, VAM, PM, HVOF, Plasma Spraying
- MATERIALS:
 - Nano-sized Reinforced Al Composites
 - Intermetallic Matrix Composites
 - Amorphous and Nanostructured Coatings
 - Complex Metallic Alloys (Quasi crystals)
 - High Entropy Alloys
 - Various conventional monolithic alloys and composites

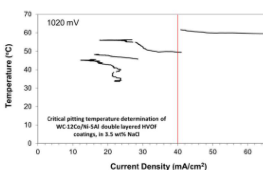
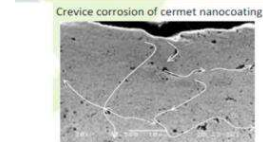
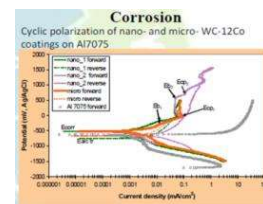
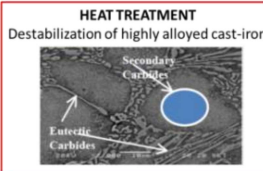
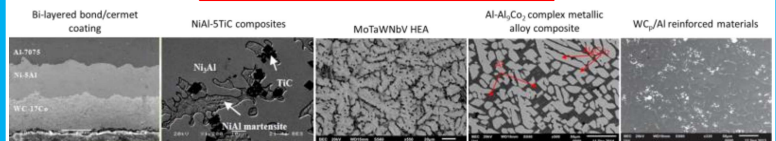
Improved mechanical, wear and corrosion resistance

HEAT TREATMENT

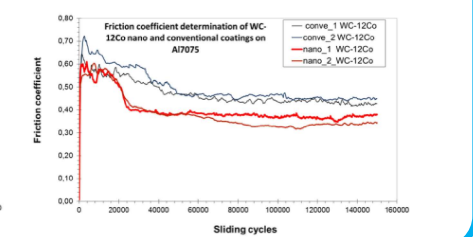
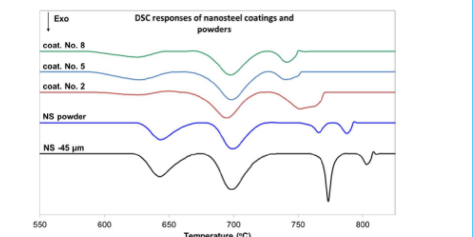
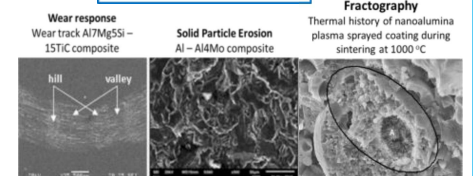
CHARACTERIZATION

- Microstructure (Metallography, OM, SEM, XRD, Raman)
- Mechanical properties (Tensile tests, Micro – macro hardness, 3 point bending, Fractography)
- Corrosion performance (Electrochemical techniques, Pit corrosion, Corrosion of weldings, Critical pitting temperature, Salt spraying)
- Wear and friction behavior (Sliding wear, Profilometry)

Materials Development

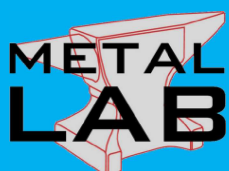


CHARACTERIZATION



Indicative Publications

- [1] A. Lekatou, A. Sfikas, C. Petsa, A.E. Karantzalis, *Metals* (2016).
- [2] A. Pouliá, E. Georgatís, A. Lekatou, A.E. Karantzalis, *Int. J. of Refr. Met. And Hard Mat.* (2016).
- [3] A. Lekatou, A.E. Karantzalis, A. Evangelou, V. Gousia, G. Kaptay, Z. Gacsi, P. Baulmi, A. Simon, *Mat. & Des.* (2015).
- [4] A. Lekatou, D. Sioulas, A.E. Karantzalis, D. Grimanelis, *Surf. & Coat. Tech.* (2015).
- [5] H. Mavros, A.E. Karantzalis, A. Lekatou, *J. Comp. Mat.* (2013).
- [6] A. Lekatou, A.K. Sfikas, A.E. Karantzalis, D. Sioulas, *Corrosion Science* (2012).



<http://users.uoi.gr/metallab>

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Metallurgy Lab Equipment

Heat-treatment, alloy manufacturing and high-temperature corrosion testing equipment

- Induction melting furnace
- Electric resistance melting furnace 900 °C (pilot plant cast system)
- Four heat treatment electric resistance furnaces
- Vacuum Arc Melting furnace
- Rolling machine

Corrosion testing equipment

- Three Galvanostats – Potentiostats: conventional, for Critical Pitting Temperature determination and Weld measurements
- Corrosion cells
- Salt spray chamber

Mechanical testing equipment

- Tensile testing machine (100 kN) also performing 3 and 4 point bending tests
- Impact testing machine
- Hardness tester (HRB, HRC)
- Micro-hardness tester
- Ball-on disc Tribometer
- Profilometer

Metallography equipment

- Optical microscope with Image Analysis Software
- Grinding and polishing machine

