ARISTOTLE UNIVERSITY OF THESSALONIKI

RESEARCH COMMITTEE

ADVANCED MATERIALS AND DEVICES LABORATORY (AMDE LAB)

Advanced Materials and Devices Laboratory (AMDE Lab) principally focus on the development of high-tech materials, fundamental studies of material properties, organizing educational scientific events including lectures and workshops, and nurture collaborations with Universities, research centers and industry partners. We are based in Physics Department of Aristotle University of Thessaloniki and have established a significant new technology presence in the country.

Key aspects of the research conducting in AMDE Lab are:

1. Formation and synthesis of high-tech materials.
2. Structural and chemical state characterization using X-ray methods.
3. Optical Properties and Spectroscopy.
4. Thermal analysis.
5. Morphological characterization and elemental analysis of materials and surfaces.

ADVANCED MATERIALS AND DEVICES LABORATORY (AMDE LAB)

AMDe lab
LABORATORY OF ADVANCED MATERIALS AND DEVICES

Head of the Laboratory Konstantinos Chrissafis

Members of the Lab/Research Team George Vourlias, Eleni Pavlidou, Panagiotis Patsalas, Triantafyllia Zorba, Christina Kyriakou-Tziamtzi, Theopoula Asimakidou, with additionally 4 Post-Doctoral and 10 PhD students

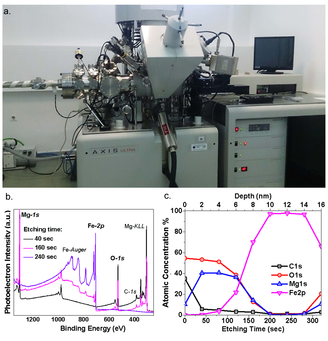

Figure 1: (a) A Kratos AXIS Ultra^{DLD} (Shimadzu group company) X-Ray Photoelectron (XPS) and Scanning Auger Microscopy and Spectroscopy System (SAM/AES). XPS measurements on Fe (12 nm)/MgO (10 nm) thin bilayers performing Ar^{+} etching process. (b) Representative wide-scan (full range) spectra. (c) Depth profiling of elementary atomic concentration.

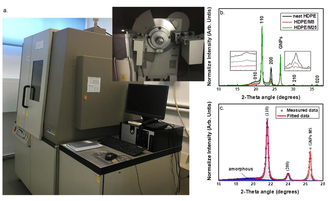

Figure 2: (a) A water-cooled 2 cycles Rigaku Ultima diffractometer equipped with a Cu X-ray beam source operating at Bragg-Brentano and Grazing Incidence (GIXRD) geometry. (b) Diffraction patterns of polymers and (c) modeling of the experimental data.

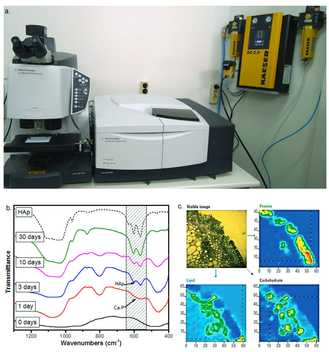

Figure 3: (a) An Agilent Cary 670 Fourier Transform Infrared (FTIR) spectrometer (spectral range 9000-20 cm^{-1}) with an Agilent Cary 620 FTIR microscope, equipped with a Focal Plane Array detector (FPA), used for the molecular investigation and characterization of materials. (b) Data collection in Transmittance and Reflectance mode. (c) High resolution real time chemical imaging of plant tissue obtained using the FPA detector.

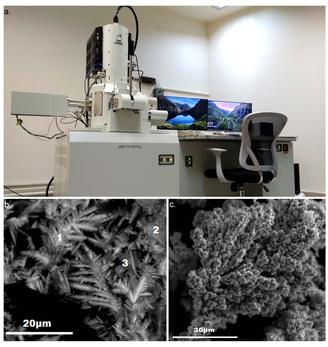

Figure 4: A JEOL JSM-7610FPlus Schottky Field Emission Scanning Electron Microscope (SEM) coupled with Energy Dispersive X-Ray (EDX) microanalysis. The method provides chemical and structural analysis of specimens as well as topographical imaging of the surface. (b) and (c) pictures show high resolution SEM images of the morphology of various dendrite specimens.

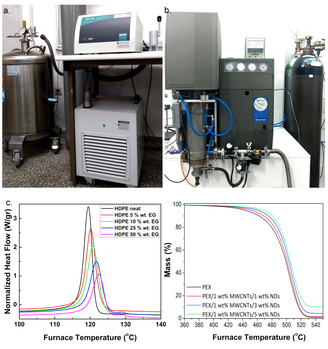

Figure 5: (a) NETZSCH Differential Scanning Calorimeter (DSC 214 Polyma) used for the determination of the energy limits of materials in physicochemical processes. (b) Thermogravimetric and Differential Thermal Analyses (TG-DTA) are conducted by SETARAM SETSYS 16/18, used for the identification of phase transformations by temperature fluctuations and prediction of oxidation resistance. (c) Heat flow and mass degradation dependence on temperature for various polymer nanocomposites.

Figure 6: Material synthesis and growth using conditions of industrial production line, as Hot dip galvanizing, CVD methods, Electrodeposition and Melt-mixing. Application Fields regarding Synthesis and Characterization of Coatings and thin film technology, Thermoelectric Materials, Biomaterials-Bioceramics, etc. The images show (a) the Electrodeposition and (b) the CVD setup installed in the AMDe lab.

Contact information

Tel: +30 2310 998 188

Email: hrisafis@physics.auth.gr

Web: amdelab.physics.auth.gr