ARISTOTLE UNIVERSITY OF THESSALONIKI
RESEARCH COMMITTEE

X-RAYS, OPTICAL CHARACTERIZATION AND THERMAL ANALYSIS LABORATORY

"The scope of X-Rays, Optical Characterization and Thermal Analysis Laboratory (XOpTh - AUTh), located in the Department of Physics AUTh, is the development and the research of high-tech activities, the collaboration with research centers and academic institutions, and the organization of lectures and other scientific events."

The research objectives of XOPTh - AUTh are:

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

Application Field

- Coatings and thin film technology
- Thermoelectric Materials
- Polymer Nanocomposites (thermally conductive polymer nanocomposites, pipes for geothermal applications, thermosetting adhesive from renewable new materials)
- Biomaterials-Bioceramics
- Works of Art and Cultural Heritage
- Minerals & Gemstones

X-Rays, Optical Characterization and Thermal Analysis Laboratory (XOpTh - AUTh)

Head of the Laboratory
Konstantinos Chrissafis , Professor

Main members of the Lab/Research Team
Konstantinos M. Paraskevopoulos, Professor • George Vourlias, Assoc. Professor • Eleni Pavlidou, Professor • Panagiotis Patsalas, Professor • Dr. Triantafyllia Zorba, Lab. Teach. Staff • Dimitra Kourtidou Lamprini Malletzidou

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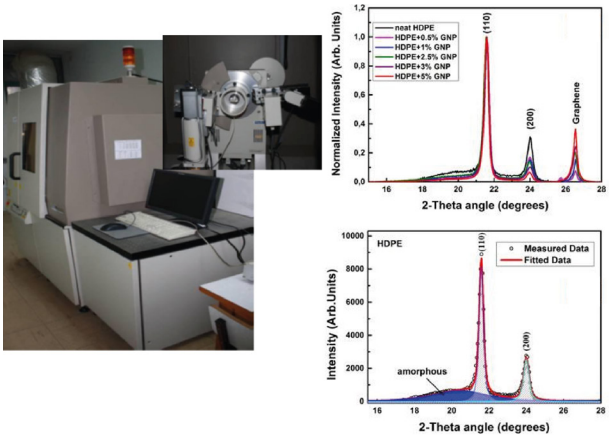

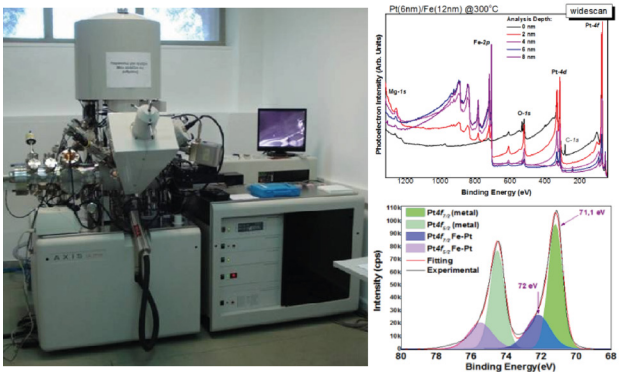

Figure 1

X-ray diffraction (XRD) patterns are recorded by a water-cooled 2 cycles Rigaku Ultima diffractometer using CuKa radiation operating at Bragg-Brentano and Grazing Incidence (GIXRD) geometry. Surface and depth profiling analyses are performed by X-ray photoelectron spectroscopy (XPS) and Scanning Auger Microscopy and Spectroscopy System (SAM/AES) using KRATOS ANALYTICAL AXIS ULTRA DLD.

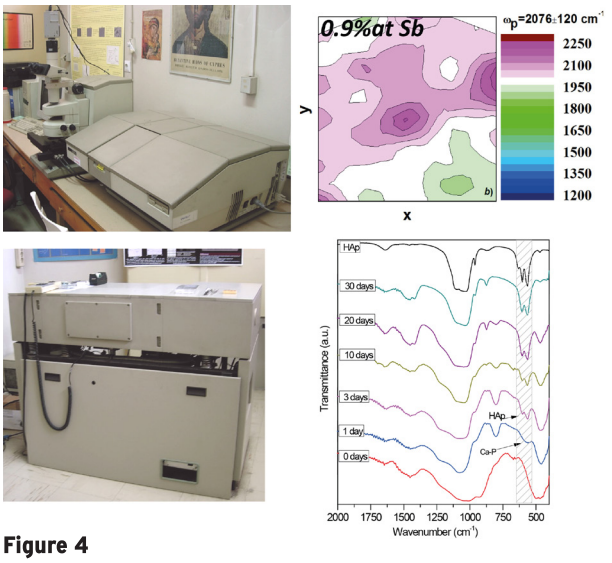

Figure 4

Surface imaging, morphology and structural examination is performed by Scanning Electron Microscopy using JEOL JMS-390LV. Coupled with Energy dispersive X-ray microanalysis (EDX), the method provides elemental analysis and topography of the specimens under examination.

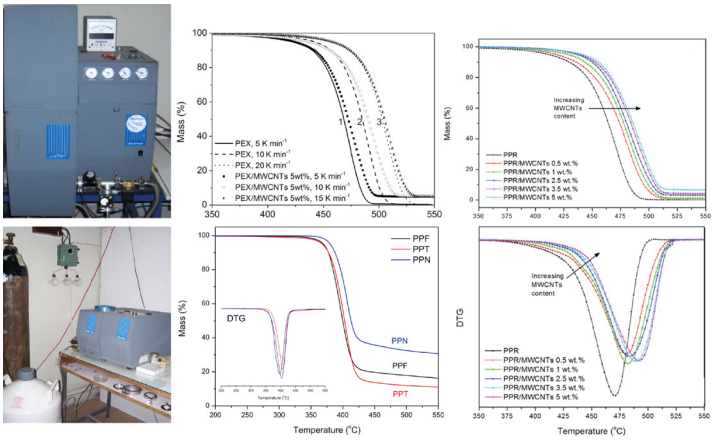

Figure 2

Thermogravimetric and Differential Thermal Analyses (TG-DTA) are conducted by SETARAM SETSYS 16/18. Identification of phase transformations by temperature fluctuations and prediction of oxidation resistance. Differential Scanning Calorimetry is performed by DSC SETARAM 141 for the determination of the energy limits of materials in physicochemical processes.

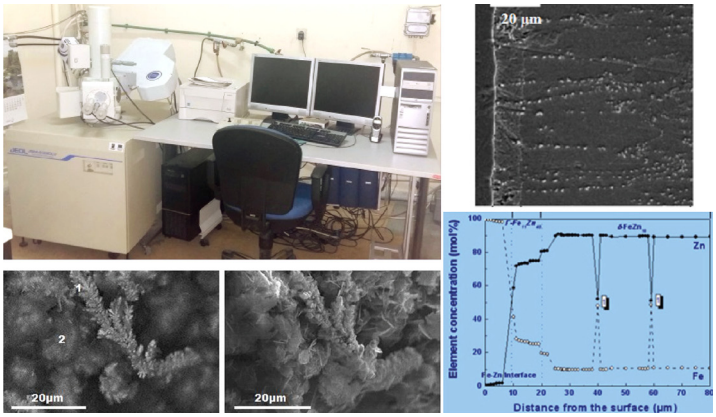

Figure 3

FTIR microscope i-series PerkinElmer, connected with spectroscope Spectrum 1000, PerkinElmer and FTIR spectrometer IFS 113v Bruker (spectral range 20.000 - 20 cm-1 with vacuum operation). Data collection in Transmittance and Reflectance mode. For the molecular investigation of materials, including characterization, progress in synthesis and ageing studies.

Figure 5

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, Polymer Nanocomposites, Biomaterials-Bioceramics, Works of Art Preservation, Minerals & Gemstones, etc.

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