PARTNER PRESENTATION AND INTEREST IN HORIZON EUROPE PARTICIPATION

Name of the organisation	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT OF ISOTOPIC AND MOLECULAR TECHNOLOGIES - ITIM
Country	Romania
Type of organisation	NATIONAL INSTITUTE FOR RESEARCH AND DEVELOPMENT
Short description	With more than 70 years of tradition in research, ITIM is nowadays involved in a wide area of micro- and nanotehnologies. The main focus of our developments is on carbon structures, nano/micro-porous materials, magnetic micro/nanogels, thin films, micro/nano-patterned surfaces, magnetic / semiconducting nanoparticles and clusters, novel polymers / copolymers and micro/nanocompozites based on them, or hybride nanosystems built on such platforms. The envisaged major practical applicability domains are: environement protection / depolution, health – including nanomedicine, energy and combating climate changes, nanoelectronics, safety and security, information and communication technology, agriculture.
Laboratory/ Faculty Department	Research team: "Nanocomposite Materials with Adjustable Properties"
Contact person	Dr. Dana Toloman
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Short description of Laboratory/ Faculty Department involved

The research team "***Nanocomposite Materials with Adjustable Properties***" has expertise in obtaining and developing nanometric magnetic composites from a fundamental and applicative poin of view. The approached technological applications are: environmental protection, photodynamic therapy, contrast agents in medical imaging, magnetic hyperthermia, micromagnets coupled by exchange, etc. http://ro.itim-cj.ro/grupuri-de-cercetare/materiale-nanocomposite-cu-proprietati-ajustabile/

Expertise

1. Chemical preparation (MC) and laser pulse deposition (PLD)

- Nanocomposites based on semiconductors and magnetic materials, with adjustable composition and properties used in environmental protection (MC)
- Nanocomposites based on carbon structures decorated with semiconductor (MC) nanoparticles
- Magnetic materials reinforced by exchange with applications in energy storage (MC, PLD)
- Semiconductor thin films obtained by PLD used in the production of electricity by photovoltaic effect
- Ferromagnet / semiconductor multilayer thin films obtained by PLD with applications in spintronics;

- Biofunctionalized magnetic nanocomposites in various architectures with medical applications (MC)

2. **Nanostructures characterization**

- Quantitative and qualitative compositional analysis by high resolution photoelectron spectroscopy (XPS)
- Study of conduction or valence bands by UV-excited photoelectron spectroscopy (UPS)
- Structural characterization by X-ray diffraction (powders and thin layers)
- Magnetic characterizations; maximum field 8T, temperature range 3 - 300 K (VSM, SQUID)
- Electron Paramagnetic Resonance (EPR)

Involved persons. Short CV

Dr. Ovidiu Pana graduated the Faculty of Physics, Babes-Bolyai University, Romania. Since 1982 he is working at the National Institute for Research and Development of Isotopic and Molecular Technology, Cluj-Napoca. He is Senior Researcher I, Head of Department: Physics of Nanostructured Systems from 2008 and he is the leader of the research team *Nanocomposite Materials with Adjustable Properties.*

He has important scientific results in the field of (i) Nanostructures preparation by chemical methods and pulsed laser deposition (PLD) such as nanocomposites based on semiconductor and magnetic materials with adjustable composition and characteristics used in environmental protection; exchange coupled magnetic materials with applications in energy storage; semiconductor thin films used in electricity production by photovoltaic effect; biofunctionalized nanocomposites in various architectures with medical applications (ii) nanostructures characterization: quantitative and qualitative elemental analysis by XPS, X-ray diffraction (particle and thin layers), magnetic characterization (CSM, SQUID), electron spin resonance, thermal treatments, photoluminescence spectroscopy, UV-Vis; (iii) study of interface phenomena in composite nanostructured materials: charge and spin transfer, quantum coupling processes. Metrics information: 78 ISI articles, h index 19, 1034 citations. Ongoing projects: PN-III-P2-2.1-PED-2019-3484 ”Permanent magnets with high efficiency and low costs"; 5/5.1/ELI-RO/ Nr.17 “PAES approaches for the study of thin film surfaces and interfaces”.

Dr. Dana Toloman graduated the Faculty of Physics, Babes-Bolyai University, Romania and received the PhD in 2010. Since 2001 she is working at the National Institute for Research and Development of Isotopic and Molecular Technology, Cluj-Napoca. She has a rich experience in the field of diluted semiconductor nanoparticles (ZnO, SnO_2, TiO_2 doped with 3d and 4d metal ions) and composite nanomaterials. In this context, she used modern characterization techniques: XRD, FT-IR, Raman, UV-Vis, PL and ESR spectroscopy to obtain information about structural characteristics, optical, magnetic and photocatalytic properties. She has expertise in continuous wave Electron Spin Resonance (ESR) and ESR coupled with spin trapping technique. Metrics information: 72 ISI articles, 817 citations, h-index=17.

Dr. Adriana Popa graduated the Faculty of Physics, Babes-Bolyai University, Romania and received the PhD in 2004 at Joseph Fourier University Grenoble, France. Since 2005 she is working at the National Institute for Research and Development of Isotopic and Molecular Technology, Cluj-Napoca. She achieved the most significant results in the field of nanomaterials: (i) characterization of diluted semiconductors and glasses by Electron Paramagnetic Resonance (EPR); (ii) evaluation of photocatalytic activity of oxide semiconductors and composites materials, (iii) evaluation of reactive oxygen species by EPR coupled with spin trapping technique, (iv) characterization of nanostructured semiconductors and composites materials by FT-IR and UV-VIS spectroscopy; (v) morphologic characterization of thin films by atomic force microscopy. Metrics information: 82 papers in ISI journals; 2 projects as project leader, participant in 15 national projects, 1071 citations, **h**-factor:17

Dr. Maria Stefan graduated the Faculty of Chemistry and Chemical Engineering, Babes-Bolyai University, Romania and received the PhD in 2007. Since 2002 she is working at two prestigious

research institutes: “Raluca Ripan” Institute for Research in Chemistry, “Babes-Bolyai” University Cluj-Napoca(2002-2010) and at the National Institute for Research and Development of Isotopic and Molecular Technology, Cluj-Napoca(2010-present).The important scientific results are in the field of nanostructured composites: (i) core-shell semiconductor based materials with tailored properties with photocatalytic properties; (ii) metals and rare earth doped metal oxides composite nanomaterials; (iii)charge/spin transfer at interface in magnetic-semiconductor nanocomposites; (iv) synthesis of inorganic materials by chemical methods(sol-gel, polyol, solvothermal, chemical precipitation); (v)thin film deposition by spin coating, chemical bath deposition and PLD; (vi)) characterization of nanostructured semiconductors and composites materials by FT-IR and UV-VIS spectroscopy;
She was involved in economic contracts (2004-2009) in the field of luminescent pigment for bright commercials (collaboration with Neon Lighting Cluj-Napoca) and porous oxide materials with catalytic properties for ozone decomposition (collaboration with RAAL Bistrita).
She coordinated **2** national projects, Grant CNCSIS -TD -52/2005 **’’**Thin films of metal chalcogenides with special properties” 2005-2007- Project leader-dr. Maria Stefan. Project PD-Human Resources-PN-II-RU-PD-2011-3-0239“Composite core-shell magnetic nanoparticles based on magnetite and semiconductors with predetermined properties” 2011-2013-Project leader-dr.Maria Stefan. Also, the project leader was active member in **26 national** projects. Metrics information: 51 ISI papers, 660 citations, h-index=16.

If you are interested in a particular call, please indicate the Reference of the call/ Topic of interest—potential contribution.

Have you already participated in an EU funded project? If so, provide some references.