INCDO-INOE 2000 Subsidiary Research Institute for Analytical Instrumentation, ICIA

(www.icia.ro)

Dr. Oana Cadar

"Driving talented organisations to successful Horizon Europe projects" FIT-4-NMP H2020 project

44th International Semiconductor Conference - CAS 2021

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Activity directions

- fundamental and applied research, technology development;
- elaboration of analytical methodologies for a wide range of samples;
- design and construction of laboratory analytical instruments;
- chemical analyses accredited according to SR EN ISO/CEI 17025:2005 by the Romanian Accreditation Association (RENAR);
- services of information, advice and representation for business by CENTI Technology Transfer Centre.

Research activity addresses the analytical instrumentation, environment and health, (nano)materials, development of clean technologies, bioenergy-biomass through:

- Laboratory „*Environment and Health*";
- Laboratory „*Bioenergy-Biomass*";
- Laboratory „*Analytics and Instrumentation*" .

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Main activities relevant to nanotechnologies, advanced materials and new manufacturing processes (NMP)

- fundamental and applied research;
- synthesis and characterization of (nano)materials with applications in conventional and modern technologies, and medicine;
- elaboration of analytical methodologies for a wide range of materials;
- identification, for builders and economic agents, of the market requirements regarding the technologies, services and products in the fields of (nano)materials.

- member of cluster *Advanced Materials, Micro and Nanotechnologies,* ***ADMATECH*** (https://admatech.org/).

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Arguments to support the resilience related to nanotechnologies, advanced materials and new manufacturing processes (NMP)

- interdisciplinary expertise and international visibility of the team (experienced and young researchers);
- finished and ongoing national and international collaborative research projects;
- up-to-date, available infrastructure;
- articles, patents and chapter books;
- Laboratory for Environmental Analyses, LAM (www.icia.ro/lam) with remarkable results at intercomparison proficiency testings.

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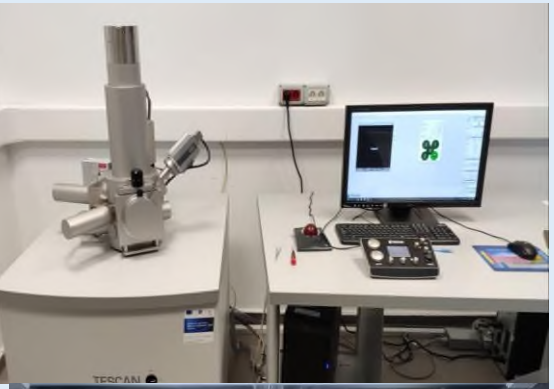
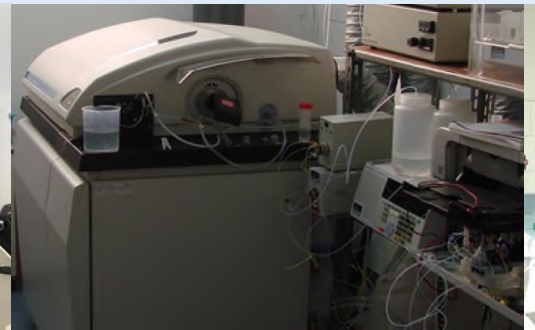


Relevant endowment (https://erris.gov.ro/ICIA-Cluj-Napoca)

- Bruker D8 ADVANCE X-ray Diffractometer (XRD);
- Tescan VEGA3 SBU-EasyProbe scanning electron microscope with energy dispersive X-ray spectroscopy Bruker Quantax 200 EDX detector;
- pXRF Brucker Tracer 5i;
- Thermo Scientific Flash 2000 CHNS/O analyzer;
- Perkin Elmer Elan DRC II inductively coupled plasma-mass spectrometer (ICP-MS);
- Thermo Scientific iCAP TQ inductively coupled plasma-mass spectrometer (ICP-MS);
- Perkin Elmer 5300DV inductively-coupled plasma optical emission spectrometer (ICP-OES);
- Perkin Elmer Spectrum BX II Fourier-transformed infrared spectrometer (FT-IR);
- Perkin Elmer Lambda 25 UV/VIS spectrophotometer.



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R&D achievements & interest relevant to nanotechnologies, advanced materials and new manufacturing processes (NMP)

- synthesis and characterization of (nano)materials with applications in conventional and modern technologies;
- behavior of (nano)materials in simulated biological media;
- evaluation of tissue biodistribution of silver and gold nanoparticles;
- new tools and smart composites based on advanced nanotechnology for medical applications;
- synthesis and characterization of biomaterials and endodontic cements with poly-functional properties;
- synthesis and characterization of undoped and doped (nano)ferrites;
- the fate and behaviour of nanomaterials in surface and groundwaters;
- testing of virgin and spent catalysts containing precious metals;
- obtaining advance materials capitalizing local natural resources (zeolites).

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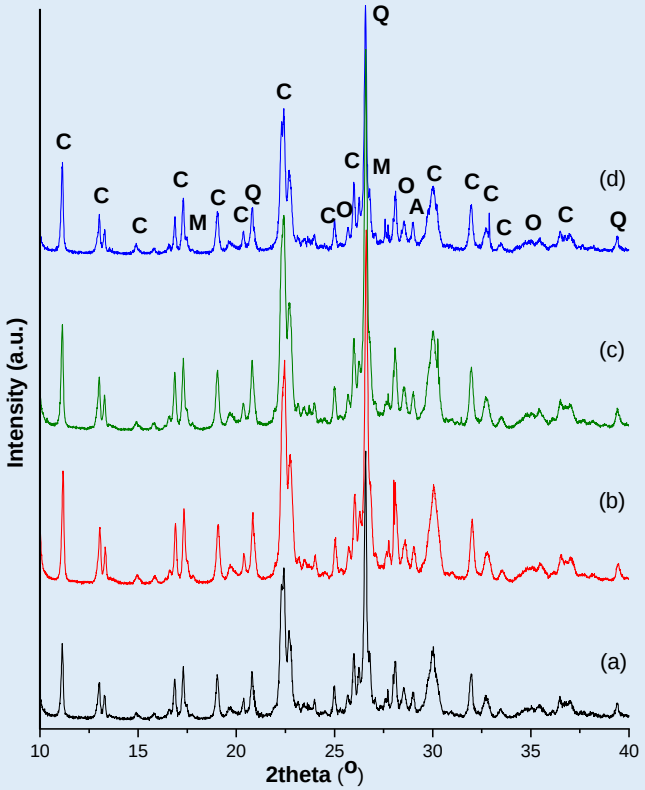
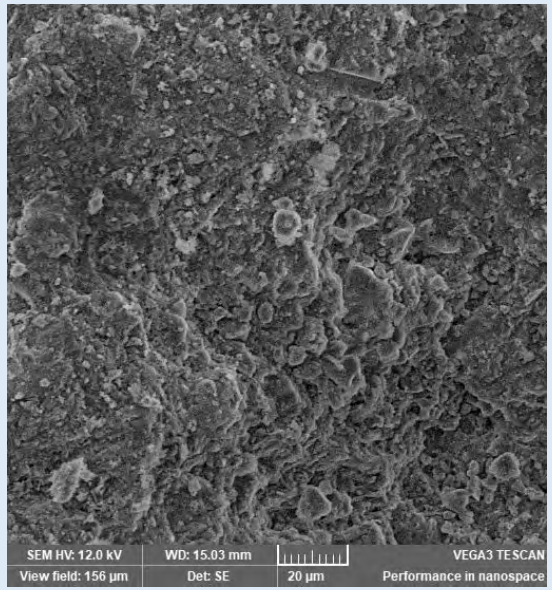
NMP - Relevant R&D projects (ongoing)

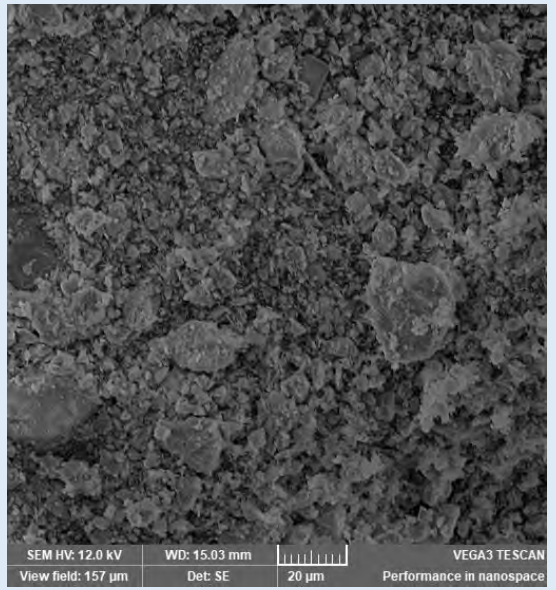


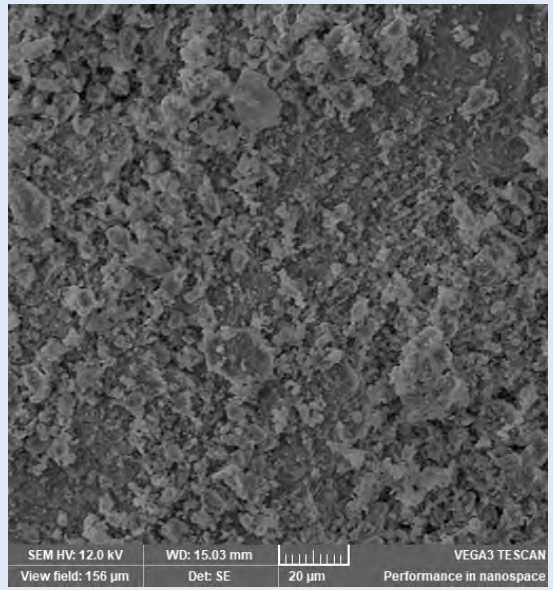
PROJECT COORDINATOR

► *Transfer of knowledge and technologies developed by INCDO-INOE 2000, ICIA subsidiary, in the field of materials for their implementation at enterprises in Romania*, **TREND**, 2016-2021.

Objectives: extending the transfer of knowledge and technology in the field of Materials towards public and private enterprises, for the superior capitalization of the zeolitic volcanic tuff from Romania.







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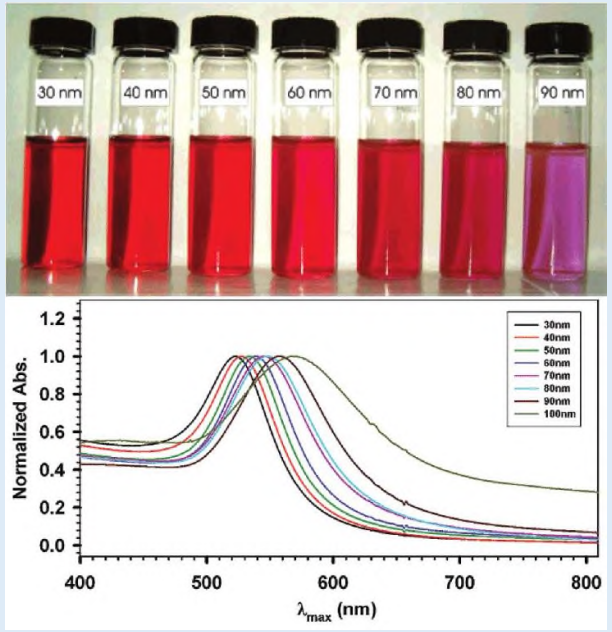

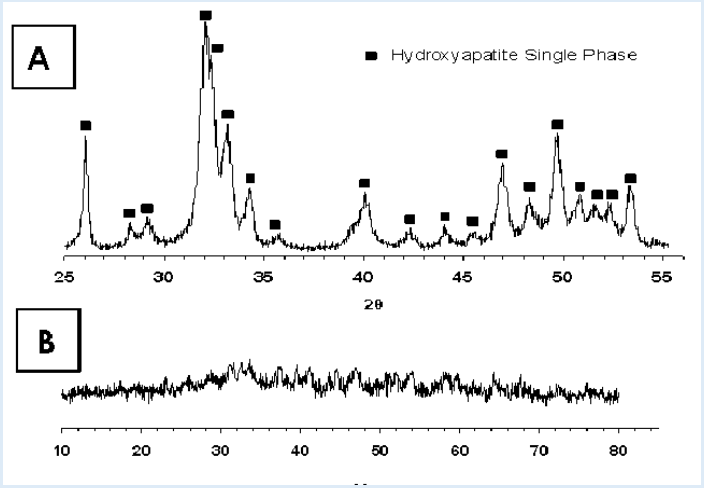

Relevant R&D projects (ongoing) - PROJECT PARTNER

►*Nanovaccinal approaches for colon cancer,* ***NANOVACOL***, PED, 323PED/2020, 2020-2022.

Objectives: new method of immunization through combined administration of functionalized gold nanoparticles.

►*Personalized intelligent matrices for tissue regeneration and meta-inflammation control*, **PRIM-TISS**, PED, 348PED/2020, 2020-2022.

Objectives: new matrix system based on polylactic acid (PLA) and nano-hydroxyapatite (nano-HAP) with embedded silver (Ag) and doxycycline (Doxy) and new method of treatment (personalized multimodal and sequential treatment targeted against periodontal pathogens) of periodontal disease.

►*Innovative materials as dietary supplements for healthcare*, **IMA-HEALTH**, PED, 481PED/2020, 2020-2022.

Objectives: new preparation methods/advanced materials based on sub-micron HAP as dietary supplements for healthcare.

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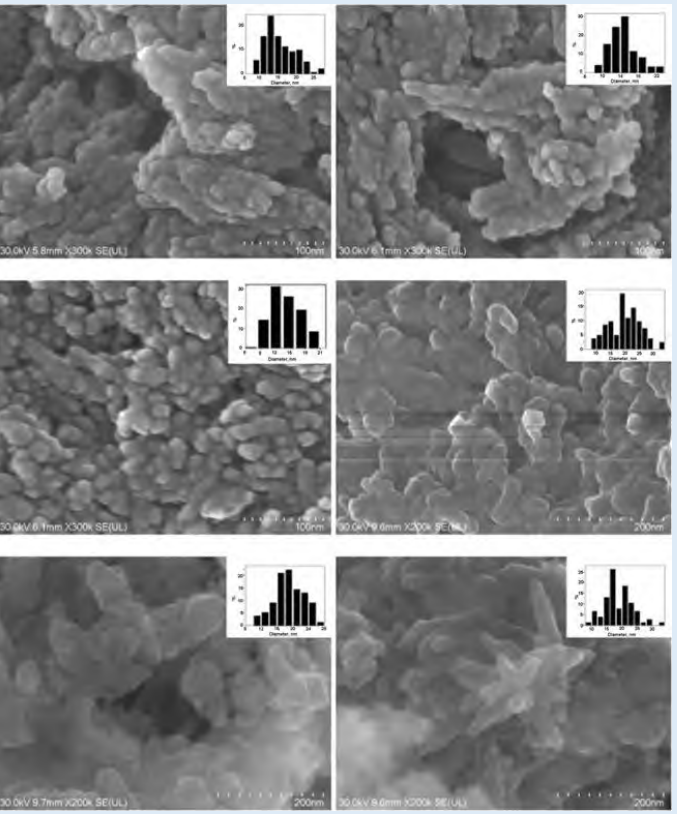
Relevant R&D projects - PROJECT PARTNER



►*Development of innovative nanomaterials based on advanced nanotechnology with applicability in prophylaxis of dental and periodontal diseases*, **INOVAMAT**, PN II Program, 241/2014, 2014-2016.

Objectives: development and optimization of new dental biomaterials and endodontic cements with poly-functional properties, obtained by specific methods of molecular or colloidal self assembly.

►*Development of new tools and smart composites based on advanced nanotechnology for medical applications*, **DONTAS**, PNII Program, 171/2012, 2012-2014.

Objectives: development of new tools and smart composites based on advanced nanotechnology for medical applications.

►*Recovery of precious metals from spent catalysts by supercritical CO_2 extraction assisted by polymers*, **SUPERMET**, COFUND-ERANET-ERAMIN, 2019-2021.

Objectives: eco-friendly disruptive technology for the recycling of precious metals, especially palladium (Pd) and platinum (Pt), from spent catalysts by extraction in supercritical CO2 ($scCO_2$) thanks to complexing polymers bringing the insoluble precious metals into the $scCO_2$ medium.

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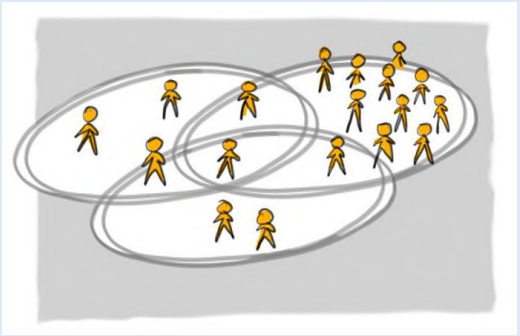
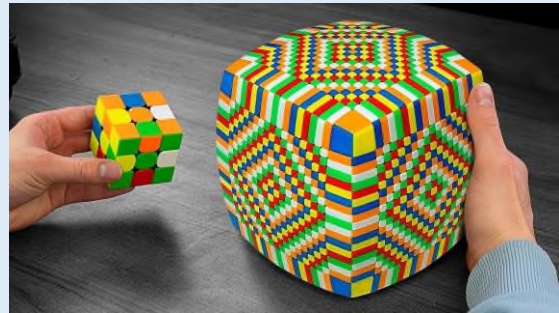
Collaborative perspectives

- synthesis and characterization of (nano)materials with applications in conventional and modern technologies;
- new tools and smart (nano)composites based on advanced nanotechnology for medical applications;
- behaviour of (nano)materials in various simulated biological media considering the parenteral, oral, buccal and sublingual, and ophthalmic routes;



- evaluation of tissue biodistribution of metallic nanoparticles;
- fate and behaviour of nanomaterials in surface and groundwaters;
- fate of cosmetics ingredients in surface and groundwaters;
- occurrence of microplastics in the aquatic environment.



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