

## FIT-4-NMP Networking and Brokerage Event

organized by FIT-4-NMP H2020 project at the 45<sup>th</sup> International Semiconductor Conference - CAS 2022

### Composite and nanocomposite materials processed through high-energy gamma irradiation

#### Short description of topic

Gamma rays are high-energy electromagnetic radiation used in various applications:

- ❑ sterilization of medical devices and food, radiotherapy, restoration and conservation of art objects;
- ❑ processing of polymeric materials for high performance applications: compatibilization of immiscible polymer blends; radiochemical crosslinking for products with shape memory; obtaining of biodegradable polymer composites;
- ❑ radiochemical synthesis of metallic nanoparticles (Ag, Cu, Au, Fe<sub>3</sub>O<sub>4</sub>, ZnO, Cu-Au, Pt, Ir, Rh, etc.) with **catalytic** (degradation of dyes, materials for the reduction of heavy metals in wastewater), **medicine** (anticancer therapy, drug delivery, antimicrobial materials), **sensors/biosensors** (determination of organic and inorganic pollutants), **renewable energy sources** (ARC PVC, storage of hydrogen, fuel cells) applications.

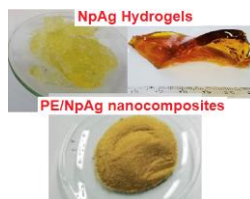
#### Expertise of ICPE-CA, Radiochemistry and Polymeric Materials Laboratory (LRMP)



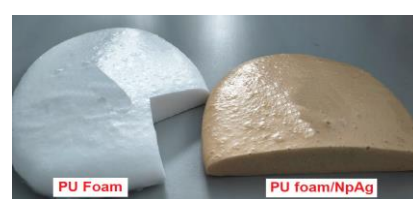
Heating cables with PTC effect



Cu-Au alloy Nps for professional surface decontamination



Polymeric antimicrobial nanocomposites for biomedical applications: wound dressing, mattresses, catheters, etc.



#### Short description of LRMP:

The main directions of research, development, and innovation of the LRMP are the followings:

- ▶ Processing of polymeric materials by ionizing radiation technologies;
- ▶ Degradation diagnosis of polymeric materials and lifetime assessment under thermo-, photo- and radiooxidative stress, UV and climatic factors;
- ▶ Qualification of some materials for operation in ionizing radiation environments;
- ▶ Radiochemical synthesis of some nanostructures (metal nanoparticles and polymer nanocomposites) for various applications;
- ▶ Accelerated aging tests (UV, gamma rays) and material characterization through different analysis techniques (FTIR, UV-Vis, Raman, DSC, CL, GC-MS). **The research infrastructure, research services and technological services** are presented on <https://eeris.eu/ERIF-2100-000T-7855>

**Organisation:** National Institute for Research and Development in Electrical Engineering ICPE-CA (INCDIE ICPE-CA) Bucharest, Country: Romania

**Address:** 313 Splaiul Unirii, Sector 3, Bucharest

**Contact details:** Head of LRMP

**Name:** Dr. Eduard-Marius Lungulescu

**Email:** marius.lungulescu@icpe-ca.ro

**Telephone:** +40.726772252

**Reference of Call/ topic of interest:**

- Advanced Materials
- Clean and circular industries

**Potential contribution:** The obtaining of high-performance materials (polymers, metal nanoparticles, polymeric nanocomposites) through green technologies (gamma irradiation) for biomedical, sensors, catalysis and renewable energy sources applications