name of the unit:

APPLIED RADIATION CHEMISTRY GROUP

Institute of Applied Radiation Chemistry, Lodz University of Technology

symbol:

I-34

http://mitr.p.lodz.pl/

head of the unit:	potential promoters:	contact person:
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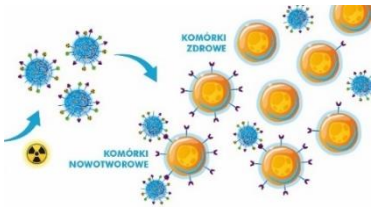
scope of activities:

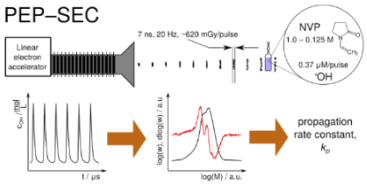
- Basic research in the field of kinetics and mechanisms of fast chemical reactions and physical processes in polymer systems, especially those initiated by radiation, photochemistry and sonochemistry.
- Development of new measurement methods for the study of fast chemical reactions and physical processes, based on the technique of pulse radiolysis.
- Development of new methods of obtaining nanomaterials, especially polymeric (nanogels, protein nanoparticles) and metallic ones.
- Development, production and testing of new polymeric biomaterials, especially hydrogels, and medical devices (including implants)
- Development, preparation and research of nanomaterials for medical applications, including nanocarriers for cancer therapy.
- Research on biocompatibility of biomaterials and medical devices, development of sterilization methods, validation of sterilization processes.
- Research on the composition, properties and thermal history of extraterrestrial matter (meteorites).

present activities:

- Testing of a new method of measuring the propagation rate constant in radical polymerization
- Construction and optimization of the pulse radiolysis system with multi-angle laser light scattering detection
- Kinetics and mechanism of radiolysis of model peptides - explanation of the mechanism of radiation cross-linking of proteins
- Development of new simulation and experimental methods for studying diffusion-controlled processes in polymer systems
- New materials for creating antibacterial and antiviral coatings
- Radiation synthesis of hydrogels from polysaccharides
- New polymer nanocarriers (nanoradiopharmaceuticals) for cancer theranostics
- Sonochemical cross-linking of polymers

graphic material





Future activities:

- Application of currently developed new experimental methods for studying mechanisms and kinetics of complex processes in polymer systems and nanomaterials
- In-depth studies on mechanisms of sonochemical reactions in polymer systems and their applications
- New polymer-based nanoplatforms for controlled delivery of drugs, genes and radioisotopes
- Radiation synthesis of “green” biomaterials based on natural polymers

The portfolio of research groups was created as part of the Programme "STER" – Internationalisation of doctoral schools” as part of the realization of the project “Curriculum for advanced doctoral education & taining – CADET Academy of Lodz University of Technology”.

Keywords: polymers, biomaterials, medical devices, biocompatibility, controlled drug delivery, sterilization, hydrogels, nanomaterials, nanogels, stimuli-sensitive materials, radiation chemistry, fast chemical reactions, pulse radiolysis, sonochemistry
List of internship proposal in this research team: • Study of the kinetics and mechanism of fast radical reactions in polymer systems and development of new tools for this purpose • Production and testing of new polymer biomaterials for selected medical applications (macro, micro or nano) • "Reactions on the whistle" - initiating chemical reactions using acoustic waves (sonochemistry)
List of attachments: See http://mitr.p.lodz.pl/biomat/