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INCT –RAPID –Centre for Radiation Research and Technology

The RAPID infrastructure of the Institute of Nuclear Chemistry and Technology (INCT) is a versatile research platform allowing pilot-scale electron beam irradiation for research and demonstrations with a broad range of beam parameters. It includes: 1) linear electron beam accelerator (LAE 10, INCT) with nanosecond pulse radiolysis set-up, 2) Linear electron beam accelerator (Elektronika, Toriy, Russia) capable of emitting electron beams of electron energy 10 MeV and a beam power of up to 15 kW, which is primarily used for radiation processing applications including sterilization and microbial decontamination, 3) pilot plant facility equipped with the ILU 6 accelerator (INP, Russia), which can emit beams of electrons with energy ranging from 0.2 to 2 MeV and an average beam power of up to 20 kW and can be used for polymer modification, liquids or gaseous samples irradiation.

The project “Crosslinking of self-assembled fatty acids on copper by electron beam irradiation” was conducted at INCT through EURO-LABS, using the ILU-6 accelerator. The aim of the study was to explore the potential of electron beams for synthesizing stable, nano-thick polymer coatings on metal substrates. In the experiments, electron beams with energies of 1.7 MeV and 250 keV were used to crosslink a layer of behenic acid, a saturated fatty acids self-assembled on copper surfaces. The results demonstrated that electron beam irradiation successfully crosslinked these thin films. Moreover, the protective properties achieved through e-beam irradiation were comparable to those obtained with gamma irradiation, while offering a faster and simpler processing method.

Work-package

WP3 - RIs for Accelerator R&D

Facility identifier

RAPID

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