NOMATEN JUNIOR SEMINAR

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Mechanical and electrical properties of polymer materials exposed to ionizing radiation

Anna Kosińska, PhD candidate at NCBJ; NOMATEN CoE and Department of Materials Physics (DFM)

ABSTRACT:

Electrical cables and wires are an integral part of a nuclear power plant (NPP) instrumentation, control and security systems. Cables are continuously vulnerable to variety of environmental stressors like high temperature, gamma radiation, humidity, chemicals and mechanical stresses. Cable insulation in NPP is made from various types of polymer materials. The long-term exposure of the cable insulation, to the standard operational environment conditions in nuclear power plant (NPP), such as radiation, heat and humidity, can cause ageing and degradation of their functional properties. Polymers exposed to such factors as ionizing and gamma radiation, undergo significant structural and functional modifications. Structure of polymer materials change under the influence of radiation and the alterations like chains scission and cross-linking occurs.

In order to simulate NPP conditions, one can perform ion irradiation with different irradiation fluences to test insulation of the materials and determine their resistance to radiation.

BIO:

Ms. Anna Kosińska is currently a PhD candidate at the National Centre for Nuclear Research. She graduated from the Medical University of Warsaw and the Warsaw University of Technology, Faculty of Materials Science and Engineering. Her research activities focus on characterization of materials by using Scanning Electron Microscopy, Energy Dispersive X-ray Spectroscopy and Electron Backscatter Diffraction. Her current work encompasses investigation of the electrical and mechanical properties of ion-irradiated polymer materials.