

FOREWORD

The Institute's of Atomic Energy main topic is safe energy generation with particular emphasis on nuclear energy as the most environment friendly technology. This has been expanded into the realm of hazards analysis and its applications to conventional plants. After Polish Government decision of 2005 on the use of nuclear power for electricity generation, the Institute in cooperation with few universities started training of students in the nuclear safety and radiation protection. The Institute takes part in preparation of expertise reports as well as research and education programs crucial for the implementation of nuclear power plants in Poland. The ionizing radiation protection issues furnish the basis of our health physics research. Material science studies performed mainly with non-destructive nuclear techniques like neutron scattering and Mössbauer spectroscopy or X-rays form an important part of our research.

The Institute of Atomic Energy operates the multifunctional nuclear research reactor MARIA. In 2007 the reactor was successfully operated for 4002 hours with a new type of fuel elements of 36% enrichment in U-235. No radiological accidents, failures or breakdowns due to the fuel behavior were recorded in 2007, confirming the good quality of the new fuel. The new fuel elements' integrity monitoring system was performing its task efficiently. The main technological applications of the MARIA reactor are: radioactive isotopes production, neutron doping of silicon and minerals properties modification. The Reactor Facility for Neutron Transmutation Doping of Silicon Single Crystals was used in doping of single crystalline and multicrystalline silicon wafers.

One of our main goals is to provide the scientific community of Poland an easy access to the source of neutrons. This involves widest possible applications of MARIA reactor in research and technology. The beams of thermal neutrons are used in neutron scattering and radiography studies of condensed matter structures and processes occurring at various levels of length scales.

66 papers describing the results of our research were published in 2007. Some of the results were accounted for in 141 IAE Reports as the preliminary step before publication. Several new results obtained in 2007 on water migration in granular media, properties of ion


beams modified materials as well as extensive use of synchrotron topography in crystal defects studies should be mentioned. The recombination methods for assessment of mixed radiation doses at various facilities were mastered.

The studies on models and software tools for emergency management were carried out within the EU Framework projects by the Centre of Excellence Management of Health and Environmental Hazards MANHAZ.

The Materials Testing Centre formed within a consortium of the IAE and the Radioactive Waste Management Plant for quick identification and categorization of unidentified or of unknown origin radioactive or nuclear items acts as an important link to the Polish response system to illicit trafficking and inadvertent movement of radioactive materials.

Our institute is open for the community. We are proud that above 5000 visitors came to enjoy our presentations and lectures on nuclear techniques developed on the basis of nuclear research reactor MARIA during 2007. Several students from Polish and foreign universities obtained student summer training in IAE laboratories in 2007.

The fusion of the Institute of Atomic Energy and the Centre of Isotope Production POLATOM, appears to be very advantageous and resulted in the substantial increase in the number of projects, publications and other accomplishments in 2007.



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