



The Abdus Salam
International Centre for Theoretical Physics



Joint ICTP/IAEA Workshop on Radiation Resistant Polymers

14 – 18 March 2011
(Miramare – Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, in cooperation with the International Atomic Energy Agency (IAEA), Vienna, Austria, is organizing the Workshop on Radiation Resistant Materials, to be held at ICTP, Trieste, from 14 to 18 March 2011.

The interest in radiation resistant formulations is manifold. On one hand, there are well-established applications of radiation resistant polymer formulations, on the other hand, there is a continuous stream of a variety of new applications that create significant challenges for material scientists for improvement of the existing radiation resistant polymers, or development of entirely new polymers, composites and hybrid materials.

For example, for over fifty years, radiation sterilization by using gamma radiation has been regarded as the safest and cost-effective methodology for the sterilization of healthcare products (single use syringes, catheters, polymer-based drug delivery devices, components of implants) and packaging, providing clean, sterile and safe products for immediate use. Another important area of application of polymers with tolerance towards ionizing radiation is the area of food packaging, adhesives and sealants. With more than 40 countries permitting the use of food irradiation for cold pasteurization, the trend is towards irradiation of packaged food, which is becoming an attractive option for the food industry worldwide. Therefore, there is a need for development of suitable radiation-resistant food packaging constructions, including adhesives and sealants. Additionally, with the renewed interest in nuclear energy and nuclear power plants, advanced solutions and development of new materials able to respond to the stringent requirements of the next generation fission and fusion reactors has become a priority. Since the irradiation-induced accelerated ageing is the crucial issue which limits the lifetime of a nuclear reactor, minimizing the rate of radiation degradation is most important. There is a wide variety of polymers used as valves, diaphragms, seals, pipes, cable insulations, adhesives of disposable coatings for personnel and adsorbents for radioactive waste, and as their properties are continuously being improved, the number of polymers used is expected to increase.

This Workshop will address all these challenges, raise awareness among the participants for the various needs of radiation resistant polymers, and at the same time offer possibilities and solutions. The Workshop will give the needed theoretical insight into the mechanism of radiation effects on polymers and their modelling, will overview the state of the art of radiation resistant polymers for various applications, and introduce the principles of increasing radiation resistance and self-repair.

PARTICIPATION:

Scientists and engineers from all countries who are members of the United Nations, UNESCO or IAEA may attend. They should hold a university degree or postgraduate degree/diploma in physics, engineering or related subjects. The Workshop will be conducted in English, therefore participants must have adequate language knowledge. Although the main purpose of the Centre is to help researchers from developing countries, graduate students and post-doctoral scientists from developed countries would equally benefit from the Workshop and are encouraged to apply.

As a rule, travel and subsistence expenses of the participants should be borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). Limited funds will be available for some participants who are nationals of, and working in, a developing country, and who are not more than 45 years old. There is no registration fee.

The **Application Form** can be accessed at the activity website <http://agenda.ictp/smr.php?2227>. Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form. It should be completed and returned before **15 November 2010**:

Radiation Resistant Polymers (smr2227)
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<http://www.ictp.it/>

Jointly with the
International Atomic Energy
Agency

DIRECTOR:

A. SAFRANY
(IAEA, Vienna, Austria)

LOCAL ORGANIZER:

S. SCANDOLO
(ICTP, Trieste, Italy)

Topics to be covered:

Effects of ionizing radiation (gamma, electrons, X-ray, particles) on polymers
Mechanism of degradation
Evaluation of radiation resistance
Principles of increasing radiation resistance
Examples of radiation resistant polymer formulations, blends, composites
Self-healing phenomena in polymers
Applications:
Medical devices (single-use and drug delivery devices) and implants containing radiation resistant formulations
Packaging materials and sealants with enhanced tolerance for radiation
Radiation resistant polymer formulations for applications in nuclear reactors
Radiation resistant polymers for deep space applications

DEADLINE:

15 November 2010