Editor Note

The irradiation of materials with energetic particles has significant effects on the properties of target materials. In addition to the well-known detrimental effects of irradiations, they have also some beneficial effects on the properties of materials. Irradiation effect can change the morphology of the materials in a controlled manner and tailor their mechanical, structural, optical and electrical properties. Irradiation induced modifications in the properties of materials can be exploited for many useful applications.

This is 2nd Trans Tech Volume on Radiation Effects to be published considering the importance of Radiation Induced Modifications of Materials. It includes 9 Papers written by experts in this field on a variety of subjects.

The first 2 Papers focus on radiation induced effects on properties of semiconductors. Tripathy et al. review some recent advances on the irradiation induced effects on the properties of semiconducting nanomaterials. They report the effect of different types of irradiations which includes γ-irradiation, electron beam irradiation, laser irradiation, swift heavy ion irradiations, thermal induced, and optical induced irradiations, etc., and discuss further irradiation induced defects in materials. In 2nd Paper, Prakash and Pushpa give an overview of different heavy ion interactions with Si BJTs, MOSFETs and SiGe HBTs by primarily focusing on the electrical characteristics of these devices before and after ion irradiation. They show that the irradiation time needed to reach very high total dose can be reduced by using Pelletron accelerator facilities instead of conventional irradiation facilities.

In 3rd Paper, "Electron Beam Modified Organic Materials and Their Applications" Chaudhary et al. describe the various types of accelerators to generate electron-beams of different energies, developed by Bhabha Atomic Research Center (BARC), Trombay. An overview of cross-linking, scissioning, curing and grafting mechanisms is presented by citing appropriate examples. Applications of electron beam-modified organic materials in different areas including bio-medical, textile, environment protection, electrical, radiation dosimetry, etc. are reviewed by the BARC scientists.

In 4th Paper, Singh et al. have reported the effects of gamma radiations on the optical, physical and structural properties of PbO glasses. The radiation induced changes created by γ-rays in the optical, physical and thermal parameters have

been evaluated for their possible application as radiation shielding material. In 5th Paper, "Conductivity Modulation in Polymer Electrolytes and their Composites due to Ion-Beam Irradiation" Divya Singh et al. have reviewed elaborate modifications in the physical and chemical properties of polymer electrolytes and their composites. The variations in properties have been explored on PEO based polymer electrolyte and correlated with the parameters responsible for such changes.

In 6th Paper, Abdel Kader et al. studied **"**Ion Beam Induced Modifications of Biocompatible Polymer" and observed important modifications of the surface properties of bombarded material such as change of friction coefficient, hardness and improved wettability. In 7th Paper, Soliman et al. discuss typical treatments of the surfaces of Mn, Fe, W and Cu metals using a low-pressure plasma system with argon gas. The wetting behavior of the treated metal surfaces was studied by employing the contact angle method.

In 8th Paper, Sajo-Bohus et al. discuss SSNTD technique of photo-neutron characterization and report their results on neutron fields related to radiotherapy and fusion facilities. The basic fundamentals of Neutron detection by SSNTDs, radioisotope photon-neutron sources, and a resume of photo-neutron converters is given in detail in this review paper.

In the 9th Paper, "Modgil-Virk Formulation of Single Activation Energy Model of Radiation Damage Annealing in SSNTDs: A Critical Appraisal", HS Virk has given a critical evaluation of Modgil-Virk Single Activation Energy Model of Radiation Damage in SSNTDs used for charged particle detection. Its empirical formulation is based on radiation damage annealing experiments carried out in Author's laboratory. It is more than three decades this Model was proposed after testing its application in all types of SSNTDs, viz., Mineral crystals, Glasses and Polymers, but it has yet to gain its rightful slot in the scientific literature.

H.S. Virk