

PREPARATION OF PMMA-BASED SEMICONDUCTOR

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ABSTRACT

PREPARATION OF PMMA-BASED SEMICONDUCTOR

In this study the Poly (methyl methacrylate) block with 10 mm thickness was irradiated using Electron Beam Accelerator at 50 kGy radiation dose. The energy band gap obtained from this irradiated sample was 3.50 eV which falls in the range of most common semiconductors. From the Hot Probe measurement, it was found that this irradiated PMMA was an n-type semiconductor. Therefore, it can be concluded that the charge carriers in this irradiated PMMA system were electrons. These electrons were released from the breaking of CH₂ and CH₃ groups of PMMA structure that had been confirmed from the Fourier Transform Infrared analysis (FTIR). The decrease in the glass transition temperature, T_g and the decomposition temperatures, T_d of the irradiated PMMA system obtained from the differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) thermogram supported the occurrence of bond breaking in the structure. This can also be confirmed from the roughness structure obtained in the optical micrograph of the irradiated PMMA.