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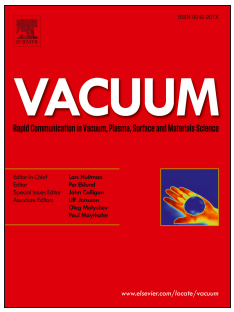

Electron beam induced modifications in electrical properties of Poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) films

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ABSTRACT

Conducting polymer Poly(3,4-ethylenedioxythiophene):poly(styrenesulphonate) i.e. PEDOT:PSS, owing to its high conductivity, enviornmental stability and low cost, is presently getting most attention for various device applications including thermoelectric, organic light emitting diodes, photovoltaics etc. We have investigated the effect of high radiation on the electrical properties of PEDOT:PSS films to manifest the scope of this polymer in high radiation field and its suitability for radiation dosimeter applications. Thin films of PEDOT:PSS were deposited on flexible polyimide (Kapton) sheets using drop-casting method and irradiated up to 75 kGy dose with 1 MeV electron beam. The conductivity of as deposited polymer film was ~ 3.2 S/cm which consistently falls to ~ 0.76 S/cm after getting 75 kGy. Detailed characterization of the samples using X-ray photoelectron spectroscopy, contact angle measurement and solubility test suggest that the lowering of electrical conductivity in irradiated sample is attributed to the crosslinking of PEDOT chains and dissociation of PSS.