

Optical Properties of Radiopolymerized Polyaniline Hydrochloride Hosted in Polyvinyl-alcohol Matrix

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ABSTRACT

Aniline hydrochloride monomer has been polymerized to polyaniline salt (emeraldine salt) with electro-chromatic properties i.e. colored conducting material by direct γ -radiation exposure to high dose up to 50 kGy. The optical color of the material has been shown as light green colour to dark green colour following the radiation doses rather than colorless indicating the polymerization of aniline salt. The optical color and the polymerization has been confirmed by using Ultraviolet visible spectroscopy (UV-visible spectroscope), which gave rise to absorbance band at 790 nm, the absorbance band in turn increased following the dose exponentially. The band gap energy of PANI was obtained and showed to be decreases by increasing the radiation dose down to 1 eV at 50 kGy indicating the electrical conductivity of PANI. Raman spectroscopy showed a new double bond C=N responsible for the appearance of the green color as a part of Polaron conducting species is created by irradiation, which has Raman shift of 1637 cm^{-1} . The double bond at C=N which is responsible for and also increases exponentially following the radiation dose.

Key ward: polymers, radiation , Polyaniline Hydrochloride