

Abstract Submitted
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Quadratic Electro-optic Effect in the Nonconjugated Conductive Polymer Trans-1,4-polyisoprene Measured at 1.55 μm SAPANA SHRIVASTAVA, MRINAL THAKUR, Photonic Mat. Res. Lab, Auburn University, AL 36849 — Quadratic electro-optic effect in the nonconjugated conductive polymer, iodine-doped trans-1,4-polyisoprene has been measured at a longer wavelength (1.55 μm) and x-ray diffraction of the polymer film has been studied. Optical absorption spectra of trans-1,4-polyisoprene (TPI) show two peaks after doping, one at 4.2eV (295 nm) due to radical cation and the other at 3.2eV (388 nm) due to charge-transfer from double to dopant. X-ray diffractometer scans show that the trans-1,4-polyisoprene film has γ -phase crystal structure. Upon doping intensities of two peaks were observed increase without significant changes in overall peak positions. Field induced birefringence technique has been used to measure quadratic electro optic effect at 1.55 μm (which is away from resonance) and an exceptionally large Kerr coefficient ($2.5 \times 10^{-10} \text{ m/V}^2$) has been obtained. This large nonlinearity has been attributed to the subnanometer-size metallic quantum dot structure produced upon doping of this polymer.

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