

Abstract Submitted
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Quadratic Electro-Optic Effect and Electroabsorption in a Novel Nano-Optical Material based on the Nonconjugated Conductive Polymer, Poly(ethylenepyrrolediy) Derivative R. SWAMY, Auburn University, P. VIPPA, Auburn University, H. RAJAGOPALAN, Auburn University, J. TITUS, Auburn University, M. THAKUR, Auburn University, A. SEN, The Pennsylvania State University — We report quadratic electro-optic effect and electroabsorption measurements in a novel nano-optical material based on the nonconjugated conductive polymer, iodine-doped poly(ethylenepyrrolediy) derivative. Such effect has been recently reported in doped polyisoprene [1]. The measurement was made at 633 nm using field-induced birefringence. A modulation of 0.1% was observed for a field of 0.66 V/micron (film thickness 0.3 micron). The change in refractive index, Δn , is 3.35×10^{-4} and the Kerr constant is $1.2 \times 10^{-9} \text{ m/V}^2$ which is about 125 times that of nitrobenzene. Modulation due to electroabsorption was 0.05%. The exceptionally large electro-optic effect is most likely due to the specific structure and quantum confinement within a nanometer volume. In contrast, nonlinearity in a conjugated polymer is known to decrease upon iodine doping. [1] Thakur, Swamy and Titus, *Macromolecules*, Vol.37, 2677, (2004).

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