

Abstract Submitted
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Two Photon Absorption in a Novel Nano-optical Material Based on the Nonconjugated Conductive Polymer, Poly(beta-pinene) JITTO TITUS, MRINAL THAKUR, Photonic Materials Research Laboratory, Auburn University, AL — As recently reported, the electrical conductivity of the nonconjugated polymer, poly(beta-pinene) increases by more than ten orders of magnitude upon doping with iodine [1]. The FTIR, optical absorption and EPR measurements have shown that radical cations are formed upon doping and charge-transfer involving the isolated double-bond in poly(beta-pinene). In this report, exceptionally large two-photon absorption in iodine-doped poly(beta-pinene) will be discussed. The linear absorption spectrum of medium-doped poly(beta-pinene) have peaks at about 4 eV and 3.1 eV. The first peak is due to the radical cation and the second due to the charge-transfer between the double bond and the dopant. The two-photon absorption of the medium-doped polymer has been measured at 730-860 nm using open-aperture z-scan with 150 femtosecond pulses from a Ti:Sapphire laser. A two-photon peak at about 1.5 eV with a magnitude of more than 1 cm/MW has been observed. The large magnitude of the two-photon absorption coefficient which is proportional to the imaginary part of the third order susceptibility has been attributed to the special structure of the radical cation and the confinement within a sub-nanometer dimension. [1] Vipra, Rajagopalan and Thakur, J. Poly. Sci. Part B: Poly. Phys., 43, 3695 (2005).

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