

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Refractive Indices of Specific Nonconjugated Conductive Polymers: Organic Nanometallic Systems PRASHANT DUBEY, SAPANA SHRI-VASTAVA, MRINAL THAKUR, Photonic Materials Research Laboratory, Auburn University, AL 36849 — Exceptionally large quadratic electro-optic effect and two-photon absorption coefficients have been recently reported for nonconjugated conductive polymers after doping. These polymers include: cis- and trans- polyisoprene, poly(β -pinene) and others. The large optical nonlinearities observed in these materials have been attributed to the nanometallic state with subnanometer dimensions that is formed upon doping and charge-transfer. Measurement and calculation of linear refractive indices of these novel nonlinear optical systems before and after doping are important. Linear absorption coefficients (UV-Visible) of trans-1,4-polyisoprene have been measured for different doping levels of iodine. Refractive indices have been calculated using Kramers-Kronig transformation of absorption data for different doping levels. Numerical integration using MATLAB software was used for these calculations. Refractive indices at specific wavelengths have been determined by measuring reflectivity at normal incidence. The calculated and measured values of refractive indices have been compared. Results on calculations and measurements on these novel systems will be discussed.

Mrinal Thakur
Photonic Materials Research Laboratory, Auburn University, AL 36849

Date submitted: 27 Nov 2010

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