

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Quadratic Electro-Optic Effect in the Nonconjugated Conductive Co-polymer Iodine-doped Styrene-Butadiene-Rubber Measured at 633 nm and 1550 nm GURUDUTT TELANG, MRINAL THAKUR, Photonic Materials Research Laboratory, Auburn University, AL — The quadratic electro-optic effect in the nonconjugated conductive *co-polymer* film of styrene-butadiene-rubber (SBR) has been measured using field-induced birefringence method. Thin films of styrene-butadiene-rubber have been prepared on various substrates from a chloroform solution and characterized using optical absorption spectroscopy, FTIR and DSC before and after doping with iodine. The optical absorption spectrum at low doping shows two peaks: one at 4.27 eV and the other at 3.2 eV corresponding to the radical cation and charge-transfer transition. FTIR data indicate =C-H vibration bands (964 cm^{-1} and 910 cm^{-1}) of polybutadiene decrease upon doping due to transformation of the double bonds into radical cations. The Kerr coefficients as measured at 633 nm and at 1550 nm are $3.1 \times 10^{-10}\text{ m/V}^2$ and $1.3 \times 10^{-10}\text{ m/V}^2$ respectively. These exceptionally large values have been attributed to the subnanometer metallic domains formed upon doping and charge-transfer involving isolated double-bonds.

Mrinal Thakur
Photonic Materials Research Laboratory, Auburn University, AL

Date submitted: 14 Nov 2011

Electronic form version 1.4