

Abstract Submitted
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**Quadratic Electro-optic Effect in Nanometallic Particles in Glass;
Comparison with Iodine-doped Nonconjugated Conductive Polymer**

JUSTIN VAN CLEAVE, and, MRINAL THAKUR, Photonic Materials Research Laboratory, Auburn University, AL — Quadratic electro-optic effect in gold nanoparticles in glass has been measured using field-induced birefringence at 633 nm. The gold particle sizes have been estimated using the surface plasmon resonance spectra. In a typical example, a phase change of about 5×10^{-4} has been observed for a 4 cm long gold-glass sample (particle size ~ 48 nm) at an applied ac field of about 0.2 V/micron. The measured Kerr coefficient is about a factor of 10^5 less compared to an iodine-doped nonconjugated conductive polymer. The effect of particle-size, concentration and resonance enhancements have been considered to compare the nonlinearities. The results are consistent with the subnanometer size of the metallic quantum dots created upon doping and charge-transfer involving the isolated double-bond in nonconjugated conductive polymer.

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