

Third-order nonlinear optical properties of silver nanoparticles mediated by chitosan

ABSTRACT

Silver nanoparticles in chitosan medium were prepared by the chemical reduction method. Silver nitrate and hydrazine were used as the precursor and reducing agent in the presence of chitosan as a natural host polymer. The samples are characterized by UV-visible spectroscopy, X-ray diffraction (XRD) and transmission electron microscopy (TEM). The measurements of nonlinear optical properties were defined by Z-scan technique using green CW laser beam operated at 532 nm wavelengths. Thermal effect has a dominant role in the overall material nonlinearity with CW laser. It is shown that the synthesized samples have a negative nonlinear refractive index.

Keyword: CW laser; Nonlinear refractive index; Silver nanoparticles; Z-scan