Thermally induced nonlinear refraction of gold and silver polyvinvinylpyrrolidone nanofluid

ABSTRACT

The nonlinear refractive index of metal Au and Ag nano-fluids prepared by γ-radiation method was investigated by a single beam Z-scan technique. Under CW 532 nm laser excitation with power output of 40 mW, the Au and Ag nano-fluids show a large thermal-induced nonlinear refractive index. In the present work it was determined that the nonlinear refractive index for both Ag and Au nano-fluids are -4.80×10-8 cm2/W and -3.85×10-8 cm2/W respectively. The values of Δn0 for both samples were also calculated to be -2.05×10-4 and -1.64×10-4 respectively. Our measurements also confirmed that the nonlinear phenomenon was caused by the self-defocusing process making them good candidates for non linear optical devices.

Keyword: Nonlinear Refractive Index; Optical Materials; Nanoparticles