

Laser stimulated optical features of gold

Abstract

We have performed complex studies of regular sized gold nanoparticles (AuNPs), which were commercially available and attached on the surfaces of indium tin oxide (ITO) substrates with a cross-linker molecule, 3-aminopropyltrimethoxysilane. Using the hyperfine AFM methods including the surface topology we have classified three types of samples which are different by the sizes. We have studied their laser induced absorption and third harmonic generation versus the sizes of nanoparticles. The particular influence of size dispersion on the output optical and nonlinear optical effects are studied. The processes are explained within a framework of interactions between the surface Plasmon resonances and the inter-band transitions.