Abstract

In this paper, Localized Surface Plasmon Resonance (LSPR) of periodic two-dimensional (2D) gold nanoparticles arrays is investigated using far field polarization spectroscopy. Square and rectangular arrays of 60 nm gold nanoparticles with different interparticle spacings are fabricated with Electron Beam Lithography (EBL). The experimental extinction cross section spectra are revealed the existence of two plasmon modes depending to the polarization direction of the incident radiation on the sample. The extinction spectra are calculated using Coupled Dipole Approximation (CDA). Good qualitative and quantitative agreement is obtained between calculations and experimental results. Moreover, it is found that the interparticle spacing on the array was the key parameter to study the plasmon interaction between the nanoparticles and to determine the amplitude, spectral position and width of LSPR band.