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Raman spectroscopy of gold nanoparticles in polycrystalline LiF film

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Abstract

Results of the Raman spectroscopy analysis of a new composite material based on a thin polycrystalline LiF film containing gold nanoparticles are presented. The formation of spherical gold nanoparticles in the film has been confirmed by the X-ray structural analysis and observation of the optical plasmon resonance absorption spectrum with a maximum at 534 nm. The obtained composite layers have been subjected to annealing by ruby laser ($\lambda = 694$ nm) in the spectral region on a descending long-wavelength wing of the plasmon absorption band of gold nanoparticles. Raman spectroscopy has been applied for the first time to the investigation of the modification of the shape of gold nanoparticles in LiF during laser annealing. The experimental Raman spectra are compared with calculated modes of in-phase bending vibrations generated in gold nanoparticles. © 2013 Pleiades Publishing, Ltd.

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