

OPTICAL AND PHOTOLUMINESCENT
PROPERTIES OF GOLD NANOSTRUCTURES
OBTAINED BY PULSED LASER
DEPOSITION IN VACUUM

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S u m m a r y

The method of pulsed laser deposition in vacuum is used for the formation of gold films and composite films of aluminum and silicon oxides with gold nanoparticles. We measured the transmission spectra, as well as the time-resolved photoluminescence spectra in the visible spectral region, and established the conditions for the formation of gold nanostructures, whose extinction spectra include a resonance band related to the manifestation of local surface plasmons. A high-intensity photoluminescence with a band maximum at 2.2–2.4 eV and relaxation times reaching 5–6 μ s was for the first time observed for Al₂O₃ films with gold nanoparticles obtained at the gold concentration in the target less than 20% and having no plasmon absorption band. The relation between the optical and photoluminescent properties of films and the nature of photoluminescence connected with the interband electron-hole recombination in gold nanoparticles are discussed.