

Abstract Submitted
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Saturation effects in silver-particle aggregates due to nonlinearity A. BUIN, P. DECHATEL, H. NAKOTTE, New Mexico State University, V. DRACHEV², V. SHALAEV, School of Electrical and Computer Engineering, Purdue University — We present results for the extinction and absorption spectra of fractal aggregates consisting of silver particles, calculated in the quasistatic dipole approximation. We have solved the coupled-dipole equations iteratively, taking into account the nonlinear susceptibility $\chi^{(3)}$ (Kerr), which is introduced in terms of an intensity-dependent dielectric function. To achieve self consistency, we used a modified version of Broyden's mixing method. Nonlinearity is seen to suppress the giant enhancement effects found for linear polarizability. At intermediate intensities, we observe a tendency toward saturation and some hysteretic behaviour which is reminiscent of ferro-electrics. For fractal aggregates of particle radii in the 3-5 nm range, the behaviour is determined by saturation and nonhysteretic effects are observed.

[1] G. Amoretti et al., Phys. Rev. B 15 (1989) 1856

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