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Scattering suppression, and optimization of extremely broadband plasmonic core-shell obscurants VASHISTA C. DE SILVA, University of North Texas, Department of Physics and Advanced Materials Manufacturing Institute , PIOTR NYGA, Military University of Technology, Institute of Optoelectronics, Poland, VLADIMIR P. DRACHEV, University of North Texas, Department of Physics and Advanced Materials Manufacturing Institute — Plasmonic resonances of the core-shells (CSs) are controlled by their shell and geometry of the core to produce a broadband extinction (Ext). In comparison to metallic planar films where the Ext is contributed by both absorption (Abs) and reflection, the shells' is originated mainly by Abs. The considered CSs made of gold fractals grown on precipitated calcium carbonate (PCC) and silica particles are chemically synthesized. The optimization includes different core sizes, shapes, and shells. The Mie scattering resonance of 780nm diameter silica at 560nm is found to be suppressed by 75% and partially replaced by the Abs in the shell which results in a clear increase of the total transmission [1]. Our experiments were supported by the effective medium theory and show that light mostly goes through the epsilon-near-zero shell with a wavelength independent absorption rate. These plasmonic structures can be optimized for the broadband Ext using mass normalization. We found that the rich surface of the PCC is the best core for the fractal shells providing the highest mass normalized Ext up to 3 m2/g over extremely broad spectral range [2]. [1] V. C. de Silva et al. Opt. Mater. Exp., 5 (2015), pp. 2491–2500 [2] V. C. de Silva et al. J. Colloid Interface Sci., 484, (2016), pp. 116-124

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