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Measurements of the electric susceptibilities of Au nanorods at optical frequencies[1] JAKE FONTANA, PETER PALFFY-MUHORAY, Liquid Crystal Institute, KSU, NICHOLAS KOTOV, ASHISH AGARWAL, University of Michigan — Accurate knowledge of the electric susceptibilities of nanoparticles is of key importance in the design of optical metamaterials. We have determined the principal values of the susceptibility tensor of Au nanorods by measuring the real and imaginary phase shift of light transmitted by Au nanorod suspensions in organic solvents. The nanorods were aligned by an externally applied low frequency electric field. The real and imaginary parts of the phase shift were determined using a conoscopic Mach-Zehnder interferometer with a dye laser and a spectrophotometer, respectively. We discuss our procedure of extracting the principal values of the susceptibility tensor as function of wavelength from the experimental data. We consider the implications of our results for the construction of optical negative index metamaterials.

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