

Abstract Submitted
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Optical metamaterials with different metals and wedge demonstration of negative refraction with fishnet metamaterials at visible wavelengths¹ NIAN-HAI SHEN, THOMAS KOSCHNY, Ames Lab/Iowa State University, MARIA KAFESAKI, FORTH, COSTAS M. SOUKOULIS, Ames Lab/Iowa State University and FORTH — We investigate the influence of different metals on the electromagnetic response of fishnet metamaterials in the optical regime. We found that, instead of using a Drude model, metals with a dielectric function from experimentally measured data should be applied in order to correctly predict the behavior of optical metamaterials. Through comparison of the performance for fishnet metamaterials made with different metals, i.e., gold, copper, and silver, we found silver is the best choice for the metallic parts compared to other metals, because silver allows for the strongest negative-permeability resonance and, hence, for optical fishnet metamaterials with a high figure-of-merit. We push the negative-index metamaterials to the visible regime and our improved wedge setup provides an unambiguous demonstration of negative refraction for the designed optical metamaterial.

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