

107. Title: Pure Electric and Pure Magnetic Resonances in Near-Infrared Metal Double-Triangle Metamaterial Arrays

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Source: CHINESE PHYSICS LETTERS

Volume:28

Issue:5

Pages: 057302

Publication year: 2011

Document type: Journal article (JA)

Abstract: We experimentally and numerically investigate the optical properties of metamaterial arrays composed of double partially-overlapped metallic nanotriangles fabricated by an angle-resolved nanosphere lithography. We demonstrate that each double-triangle can be viewed as an artificial magnetic element analogous to the conventional metal split-ring-resonator. It is shown that under normal-incidence conditions, individual double-triangle can exhibit a strong local magnetic resonance, but the collective response of the metamaterial arrays is purely electric because magnetic resonances of the two double-triangles in a unit cell having opposite openings are out of phase. For oblique incidences the metamaterial arrays are shown to support a pure magnetic response at the same frequency band. Therefore, switchable electric and magnetic resonances are achieved in double-triangle arrays. Moreover, both the electric and magnetic resonances are shown to allow for a tunability over a large spectral range down to near-infrared.