

Abstract Submitted
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Tunability of electric response in a polarization-independent fishnet metamaterial N.T. TUNG, J.W. PARK, S.J. LEE, Hanyang University, Korea, J.Y. RHEE, Sungkyunkwan University, Korea, Y.P. LEE, Hanyang University, Korea — The first realization of the negative refraction in a metamaterial medium by Smith in 2000 [1], has significantly changed our understanding of the EM wave-matter interaction. Recently, a three-dimensional optical negative refraction using fishnet structure has been reported by J. Valentine *et al.* [2], which might offer the opportunity to explore a large variety of optical phenomena associated with negative-refractive index, as well as applications in the fields of scaling down of photonics and superlens imaging. In our effort to tune the electric response of the metamaterial independently from the magnetic one, we used a polarization-independent fishnet structure operating at microwave frequency and investigated their optical property changes by varying the thickness of dielectric spacer. It has been found that the overlapping frequency region of double-negative permittivity and permeability can be indeed controlled and, thereby, the negative-refraction range by changing the dielectric spacer thickness. This thickness effect is also shown more prominently in the THz-frequency regime.

[1] D. R. Smith *et al.*, *Phys. Rev. Lett.* **84**, 4184 (2000).

[2] J. Valentine *et al.*, *Nature* **455**, 376 (2008).

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