New Composite Gyrotropic Metamaterial

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In recent years, one can observe the rapid growth of research activities devoted to the materials, which exhibit the negative value of refractive index. These materials are commonly called *metamaterials*. This work is the continuation of our study started in Ref. 1. In it, we examined the possibility of fabri- cating the metamaterial in a relatively simple way. Our idea was to use the three-component mixture of ingredients, where one of them is responsible for the real part of mixture's permeability $\mathrm{Re}[\mu(\omega)]$ and the other two (silver and $Hg_{1-x}Cd_xTe$ or $Pb_{1-x}Sn_xTe$) are responsible for the negative value of real part of mixture's effective permittivity $\mathrm{Re}[\varepsilon(\omega)]$.We have shown by computer simulations that by the proper fitting of model parameters (e.g. the radius of nanoparticles, their magnetic moments, the relative concentration of ingredients) it is possible to obtain the metamaterial with negative refraction index in a relatively broad range of temperatures and external magnetic fields, both for the $Hg_{1-x}Cd_xTe$ [1] and $Pb_{1-x}Sn_xTe$ compounds.

[1] I. Tralle, P. Zięba, and W. Paśko, *J. Appl. Phys.* **115**, 233509 (2014).