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Magneto-Optical Properties of the Magnetite-Graphene Oxide Composites in Organic Solvents

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Abstract

Copyright © 2018 American Chemical Society. Graphene oxide (GO) aqueous solutions are known to form liquid crystals that can switch in electric fields. Magnetic fields as external stimuli are inefficient toward GO because of its diamagnetic properties, and GO is known to be insoluble in most of the organic solvents. In this study, composites of GO with oleate-protected magnetite nanoparticles were prepared as stable colloid solutions in the mixed isopropanol-chloroform solvents. The structure of the composite particles and the optical properties of their solutions can be controlled by the ratio of the mixing parent components. The as-prepared solutions are highly responsive to external magnetic field. As the consequence, the optical transmission and the direction of light scattering can be efficiently manipulated. These systems pave the way for fabricating functional materials, such as magneto-optical switches, density-gradient materials, and micromotors. Solubility in nonpolar organic solvents broadens the scope of their potential applications.

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Keywords

graphene oxide, iron nanoparticles, light scattering, liquid crystals, magneto-optical properties

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