

Gold nanoparticle-decorated graphene as a nonlinear optical material in the visible and near-infrared spectral range

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There have been numerous reports of boosting nonlinear optical phenomena in plasmonic nanostructures through local-field enhancement as well as through intrinsic metal nonlinearities. Here, we study the possibility of plasmonic enhancement of graphene's nonlinear absorption by creating a composite material: gold nanoparticle-decorated graphene dispersed in water. To evaluate the additive effect of combining the two materials on the saturable absorption efficiency we performed a series of f-scan (modified Z-scan) measurements using femtosecond laser pulses in the broad spectral range from 530 to 1600 nm. These studies are supplemented by TEM, UV-vis, ATR and Raman spectroscopy, revealing the mechanisms behind the formation of the composite material.

Adres publiczny

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Strona internetowa wydawcy

<https://www.rsc.org/>

