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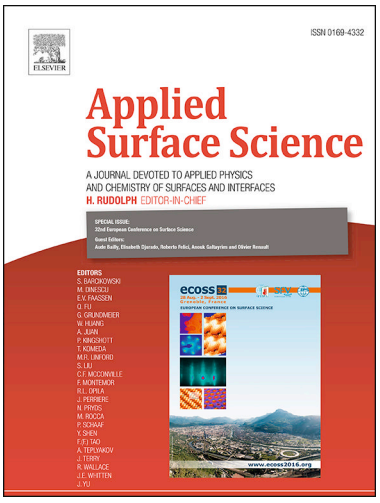

Full Length Article

Facile synthesis of carbon-supported silver nanoparticles for optical limiting

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Facile synthesis of carbon-supported silver nanoparticles for optical limiting

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Abstract

Photoexited carbon nanodots (CDs) could be both excellent electron donors and electron acceptors, offering potential applications in photochemical reactions. Using the CDs as the reductant, carbon-supported silver nanoparticles (Ag-CDs) are synthesized by ultraviolet light irradiation. The influence of the surface chemical structure of the CDs, irradiation light wavelength, reaction time, and reactant concentration on the reaction products are systematically studied. Using a nanosecond laser, we investigate the nonlinear optical response of the as-prepared Ag-CDs, which show excellent optical limiting (OL) behaviors. The OL threshold of Ag-CDs is estimated to be 0.6 J/cm^2, which is much lower than that of CDs with the OL threshold of 2.2 J/cm^2. The OL mechanism of the material is mainly attributed to the enhanced nonlinear scattering effect induced by the synergistic effect of the silver nanoparticles (Ag NPs) and supporting CDs.

1. Introduction

With their rapid development, high power laser sources have been used in many