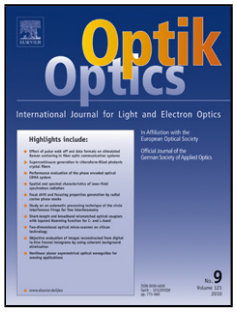


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# Reduced graphene oxide as a stabilizing layer for optical properties of porous silicon

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## Abstract

In this paper, the intrinsic instability of optical properties of porous silicon (PS) was minimized by deposition of graphene on porous structures. A typical PS showed an obvious quenching of its photoluminescence (PL) properties under long-term laser radiation. To resolve this problem, graphene thin film was grown on the porous structure using electrophoretic deposition (EPD) technique. Here, eco-friendly improved Hummer's technique was used for synthesis of charged graphene oxide (GO) sheets. The synthesized high-dispersed GO suspension demonstrated good response in electrical field. For reducing process, in order to fabricate reduced graphene oxide (RGO), thermal annealing of samples was carried out at 100 ºC under Ar ambient. The Raman studies confirmed that RGO layers have been deposited on PS substrates successfully. Compared with the PS sample, a reduction by 35% of photoluminescence (PL) intensity was observed for RGO/PS sample. This phenomenon can be explained by light absorption of 2.3% in each graphene layer. The effect of graphene as a stabilizing layer on PS substrate was observed in PL spectrum of RGO/PS sample. The PL quenching was arrested even after prolonged exposure to laser illumination. Therefore, the deposited graphene layer enhances the optical properties of PS by stabilizing the PL intensity.