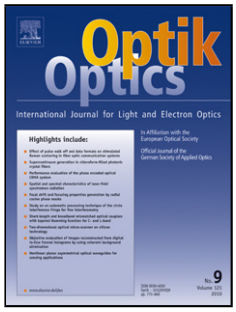

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A facile solvothermal method synthesis of nitrogen-doped graphene quantum dots/BiOX (X=Br, Cl) hybrid material for enhanced visible-light photoactivity

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Abstract

An efficient photocatalyst consisting of nitrogen-doped graphene quantum dots (N-GQDs) dispersed on the surface of the three-dimensional hierarchical bismuth oxyhalide (BiOX, X=Br, Cl) was synthesized via a simple solvothermal method. The catalysts were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), UV-visible diffuse reflectance spectrophotometer (DRS), and photoluminescence spectroscopy (PL). The N-GQDs play an important role in the improvement of photocatalytic performance because it significantly increases BiOX absorption of visible light and effectively traps photogenerated electrons to accelerate the separation of photogenerated electron-hole pairs. The superior activity of N-GQDs/BiOX was exhibited to the organic contaminant degradation under visible light. The 7 wt% N-GQDs/BiOBr and 7 wt% N-GQDs/BiOCl exhibited strong catalytic activity, in which RhB was almost