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Structural modulations of CdS/graphene oxide with Gd2O3 for degradation of methylene blue

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Efficient cleaning of contaminated water by photocatalysis has become an effective strategy in recent years due to its environmental and ecological designation. The cadmium sulfate (CdS) composition was modified with dopants including gadolinium oxide (Gd2O3) and combined with graphene oxide (GO) nanoparticles. The obtained powdered compositions are pristine Gd2O3, CdS/Gd2O3 and CdS/Gd2O3@GO. The crystallite size (Ds) of the Gd2O3, CdS/Gd2O3 and CdS/Gd2O3@GO was evaluated to be 29.62, 11.62 and 11.56 nm. The degradation of methylene blue (MB) reaches the highest values of 42.85%, 60.37% and 82.35% for pure Gd2O3, CdS/Gd2O3 and CdS/Gd2O3@GO after (60 min) under visible light irradiation with dye concentration of (0.25 ppm). However, the efficiency of MB removal reaches 65.23%, 77.93% and 91.07% for Gd2O3, CdS/Gd2O3 and CdS/Gd2O3@GO powdered compositions under UV irradiation with a dye concentration of (0.25 ppm). The degradation of methylene blue was enhanced denoting its potential employ in the applications of water treatment.

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