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High fluorescent sulfur regulating graphene quantum dots with tunable photoluminescence properties

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Abstract: Sulfur-doped graphene quantum dots (S-GQDs) were synthesized by two facile hydrothermal technologies. The photoluminescence (PL) properties of the GQDs and S-GQDs samples were mainly investigated. Through regulating the content of S powders in S-GQDs synthesizing process, the optimal S-GQDs have a high S/C atomic ratio of 19.53%. The S doping introduce more functional groups on the C sp^2 skeleton of S-3 sample and result in the appearance of the strong absorption band in the UV region. In comparison with other reported S-GQDs, the S-GQDs exhibit overwhelming high fluorescence quantum yield (57%) and excitation-independent emission, resulting from the outcome of the doped sulfur atoms. Moreover, the PL intensity of GQDs can be increased by doping it with S and the increasing efficiency depends on the thiophene sulfur content.

Keywords: *sulfur regulating, high fluorescent, graphene quantum dots, photoluminescence*

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