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Green synthesis of luminescent graphitic carbon nitride quantum dots from human urine and its bioimaging application

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Abstract

A hydrothermal synthetic approach is developed for the preparation of graphitic carbon nitride quantum dots (g-C₃N₄ QDs) from human urine. The reported synthetic method is green, simple, low-cost, less time-consuming, and can be used for the large-scale production of the g-C₃N₄ QDs. The as-prepared g-C₃N₄ QDs possess a high quantum yield of 15.7% by using quinine sulphate as a reference, and display excitation-wavelength dependent fluorescent emission. In addition, the g-C₃N₄ QDs exhibit high photostability, low cytotoxicity, and are successfully used as fluorescent probes for cell multicolor imaging. It is believed that the valuable nanomaterials, g-C₃N₄ QDs, which are transformed from the human bodily wastes, are promising in diverse chemical applications.

Graphical Abstract

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