One-step preparation of grapheme quantum dots by carbonizing citric acid for optoelectronics

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Similar to the popular luminescent quantum dots, grapheme quantum dots (GQDs) have received tremendous attention because of their unique properties, such as superiority in chemical inertness, high luminescent, biocompatibility and low toxicity.1 Consequently, GQDs are emerging as promising material for bioimaging, electrochemical biosensors, catalysis, and specifically in photovoltaic devices2, 3. Herein, a green, cheap, fast and simple bottom-up method, tuning carbonization degree of citric acid, for synthesis of photoluminescence GQDs is described. Blue and green photoluminescence can be selectively prepared by changing reaction time and dispersed into alkaline solutions. They show a high stability and strongly photoluminescence quantum yield through excitation-independent photoluminescence emission activity. The diameter of GQDs are from 5 to 25 nm and their average height is about 1.2 nm. These blue and green GQDs provide promising applications for biosensor, biological images and optoelectronic devices.