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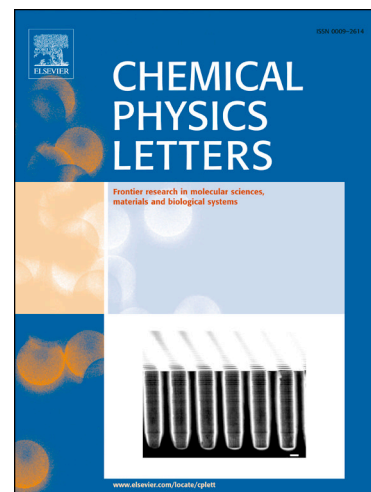
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Dual band emission in carbon dots

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Abstract

Here we report, the preparation of carbon dots showing dual band emission through hydrothermal method. These carbon dots emit 382 nm and 538 nm wavelengths, at 320 nm and 420 nm excitations respectively. However, under 365 nm excitation these carbon dots show well resolved emission peaks at 435 nm and 538 nm. The emission peak at 435 nm show excitation wavelength dependence, while the emission peak at 538 nm is independent of the excitation wavelength. The 538 nm emission wavelength in these carbon dots is due to the formation of molecular states containing double bonded oxygen functional groups (C=O and COOH) on the carbon dots surface. The blue emission is due the various surface state containing both single and double bonded oxygen functional groups on the carbon dots surface. The competition among different emission centers and non-radiative traps due the various functional groups contribute to the fluorescent properties of carbon dots.

Keywords: Carbon dot; hydrothermal method; photoluminescence; transmission electron microscopy; X-ray photoelectron spectroscopy; surface functional groups.

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