



Cite this: *New J. Chem.*, 2022, 46, 4979

RGB-multicolor fluorescent carbon dots by changing the reaction solvent type for white light-emitting diodes†

B. H. L. D. L. C. Q. L. Q. J. C. G. H. B. A. *^a

In this study, carbon dots with blue, green, and red full spectrum emission were successfully prepared by changing the reaction solvent type for white light-emitting diodes.

Carbon dots (CDs) have attracted significant attention due to their unique optical and electronic properties. They have been widely used in various fields, including bioimaging, catalysis, and light-emitting diodes (LEDs). The synthesis of CDs is typically achieved through various methods, such as hydrothermal synthesis, microwave irradiation, and laser ablation. The reaction solvent type plays a crucial role in determining the color and photophysical properties of the synthesized CDs. In this study, we successfully prepared RGB-multicolor fluorescent carbon dots by changing the reaction solvent type for white light-emitting diodes. The synthesized CDs exhibited blue, green, and red full spectrum emission, which is highly desirable for white LED applications. The results demonstrate that the reaction solvent type significantly influences the color and photophysical properties of the synthesized CDs. This study provides a simple and effective method for the synthesis of RGB-multicolor fluorescent carbon dots, which can be used in various applications, including white LED lighting.

The synthesis of carbon dots (CDs) is a complex process that involves the controlled growth of carbon-based nanomaterials. The reaction solvent type is a critical parameter that affects the morphology, size, and optical properties of the synthesized CDs. In this study, we investigated the effect of different reaction solvents on the synthesis of RGB-multicolor fluorescent carbon dots. The results show that the reaction solvent type significantly influences the color and photophysical properties of the synthesized CDs. For example, the use of water as a reaction solvent resulted in the synthesis of blue-emitting CDs, while the use of ethanol resulted in the synthesis of green-emitting CDs. The use of methanol resulted in the synthesis of red-emitting CDs. These findings provide valuable insights into the synthesis of RGB-multicolor fluorescent carbon dots, which can be used in various applications, including white LED lighting.

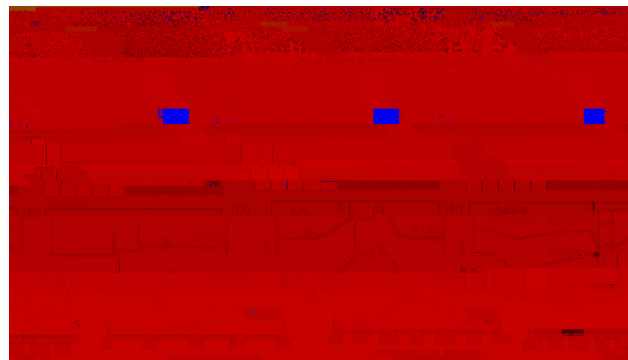


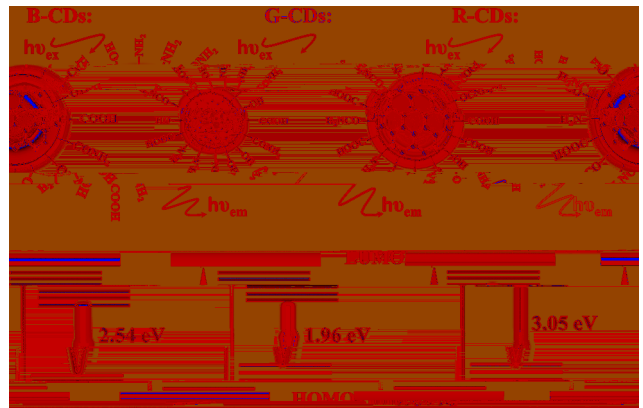
Fig. 2 (A) B-CD, (B) G-CD, (C) A-CD, (D) B-CD, G-CD, A-CD, (E) F-I, (F) B-CD, G-CD, A-CD.

Fig. 1 (A) B-CD, (B) G-CD, (C) A-CD, (D) B-CD, (E) G-CD, (F) A-CD.



Fig. 1 (A) B-CD, (B) G-CD, (C) A-CD, (D) B-CD, (E) G-CD, (F) A-CD.





$\left(\frac{1}{\lambda} \right)$

N,N -

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$

N,N -

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$

$\left(\frac{1}{\lambda} \right)$



... , *Chem. Eng. J.*, **2020**, *382*, 1–10.

... , *Nano Res.*, **2020**, *8*, 1–10.

... , *Sci. Bull.*, **2020**, *66*, 1–10.

... , *J. Phys. Chem. Lett.*, **2020**, *12*, 1–10.

... , *Sci. Adv.*, **2020**, *6*, 1–10.

... , *Adv. Mater.*, **2020**, *29*, 1–10.

... , *ACS Nano*, **2020**, *10*, 1–10.

... , *J. Mater. Chem. C*, **2020**, *3*, 1–10.

... , *Angew. Chem., Int. Ed.*, **2020**, *59*, 1–10.

... , *Nano Res.*, **2020**, *12*, 1–10.

... , *Adv. Sci.*, **2020**, *8*, 1–10.

... , *Nat. Photonics*, **2020**, *14*, 1–10.

... , *J. Mater. Sci.*, **2020**, *48*, 1–10.

... , *Adv. Mater.*, **2020**, *28*, 1–10.

... , *Nat. Commun.*, **2020**, *12*, 1–10.

... , *Nanoscale*, **2020**, *9*, 1–10.

... , *Adv. Mater.*, **2020**, *29*, 1–10.

... , *Adv. Opt. Mater.*, **2020**, *9*, 1–10.

... , *Adv. Mater.*, **2020**, *30*, 1–10.

... , *ACS Appl. Mater. Interfaces*, **2020**, *13*, 1–10.

... , *Chem. – Eur. J.*, **2020**, *26*, 1–10.

... , *Angew. Chem., Int. Ed.*, **2020**, *60*, 1–10.

... , *ACS Nano*, **2020**, *11*, 1–10.

... , *Adv. Sci.*, **2020**, *8*, 1–10.

... , *Nat. Commun.*, **2020**, *9*, 1–10.

... , *Small*, **2020**, *15*, 1–10.

... , *Nanoscale Horiz.*, **2020**, *5*, 1–10.

... , *ACS Appl. Mater. Interfaces*, **2020**, *12*, 1–10.

... , *Anal. Chem.*, **2020**, *92*, 1–10.

... , *Angew. Chem., Int. Ed.*, **2020**, *60*, 1–10.

Published on 04 March 2022. Downloaded on 4/19/2022 4:13:36 AM.