Preparation of visible light excitable phosphorescent carbon dots and their optical applications

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Room temperature phosphorescent (RTP) materials are attracting more and more the attention thanks to their advantages. Recently, researchers are looking for cost-effective, facile preparation and high performance RTP materials, and carbon dots are one of the targets. However, to synthesize carbon dots with RTP emission is still very challenging, especially for carbon dots to be excited by visible light.[1] So far, dozens of substrates have been applied in preparing RTP carbon dots, such as H_3BO_3, SiO_2, PVA and others.[2] Here, we present a novel strategy to manufacture phosphorescent carbon dots by calcinating the composites which mix green carbon dots (g-CDs) with aluminium hydroxide ($Al(OH)_3$). The processed hybrid materials (g-CDs@Al_2O_3) reveal remarkable properties, showing blue fluorescence and green RTP in an on/off irradiation process at 365 nm. It is noteworthy that, g-CD@Al_2O_3 can also emit yellow RTP after switch off the white light. Besides, this hybrid shows strong resistance in strong basic and acidic condition for 30 days. Finally, this multicolor emissive hybrid has been applied in anti-counterfeiting and encryption successfully. Our method of preparation provides a universal and facile option to obtain RTP carbon dots.[3]

References

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Figures

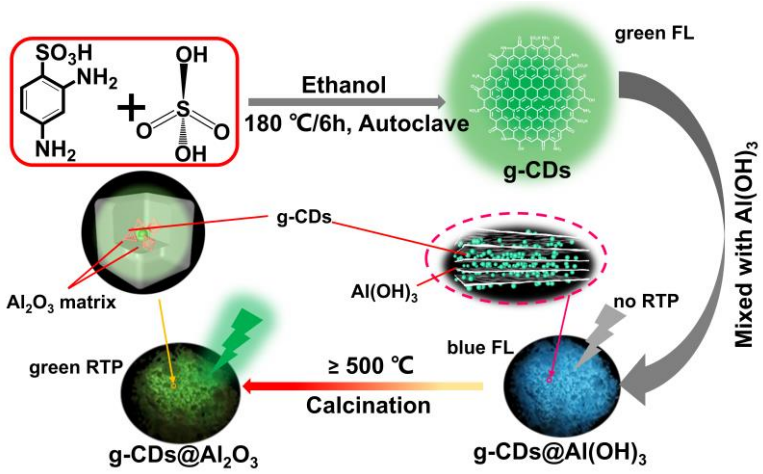

Figure 1: Flow chart illustrating the synthesis of g-CDs@$Al(OH)_3$ and g-CDs@Al_2O_3 composites.