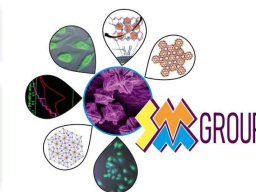


Insight into Modulation of Carbon Dot Optical Sensing Attributes Through Reduction Pathway

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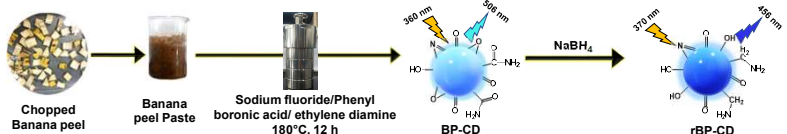
Introduction

Among the various classes of carbon nanomaterials, carbon dots (CDs) have emerged as one of the most exciting nanomaterials in fluorescent sensing applications.

Objective

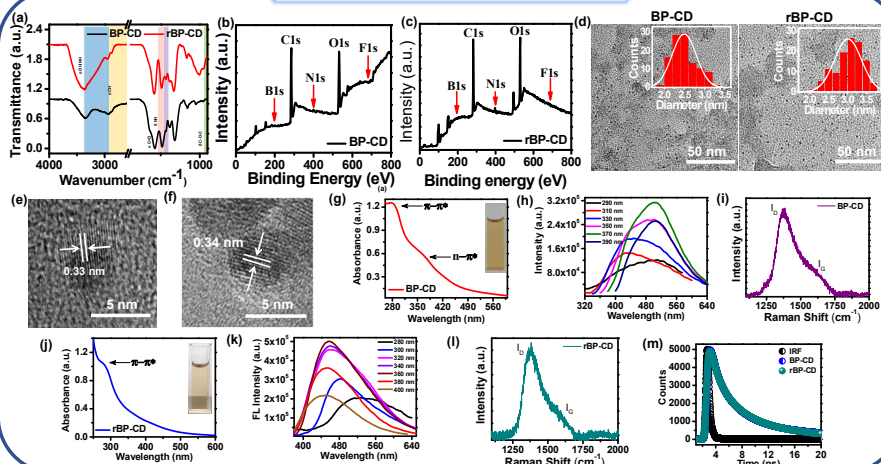
- Fabrication and characterization of reduced and non-reduced CDs.
- To investigate how the reduction could affect the surface functionalities for tuning photophysical attributes to be used for heavy metals (Co^{2+} and Hg^{2+}) and their dual sensing at trace levels.

Synthesis of Carbon Dots



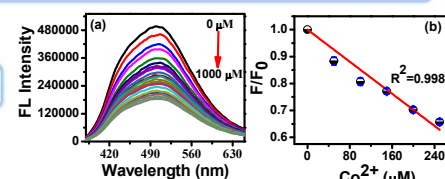
Results and Discussion

Characterization of Carbon Dots

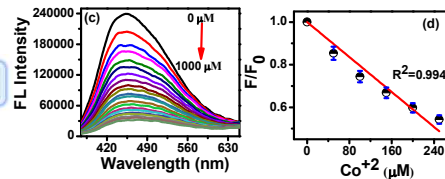


Metal Ion Sensing

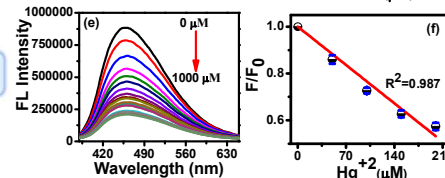
BPCDs



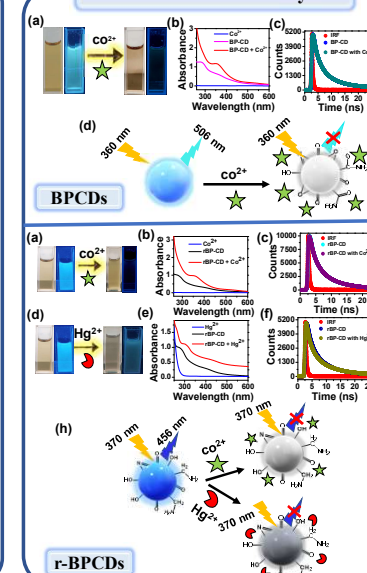
r-BPCDs



r-BPCDs



Mechanistic Pathway



Conclusion

- A visible change in the sensing behavior was observed 500 between the original BP-CDs and its reduced form (rBP-CDs). The rBP-CDs showed a dual-sensing behavior toward 502 both Co²⁺ (LOD value of 242 nM) and Hg²⁺ (LOD value of 190 nM), whereas BP-CDs sensed only Co²⁺ (with an LOD value of 180 nM).
- To the best of our knowledge, this is the first report in which a comparative study has been attempted toward a sensing application of both as-synthesized carbon dots and their reduced form as fluorescent probes

References

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- N. Soni and C. K. Nandi, Chem. Sci. 2021, **12**, 3615–3626

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