# Green synthesis of coconut coir-based carbon dots for efficient detection of ferric Ions

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## SUPPLEMENTARY DATA

### Structural Characterisation

1. **SEAD Pattern of synthesized CCDs**

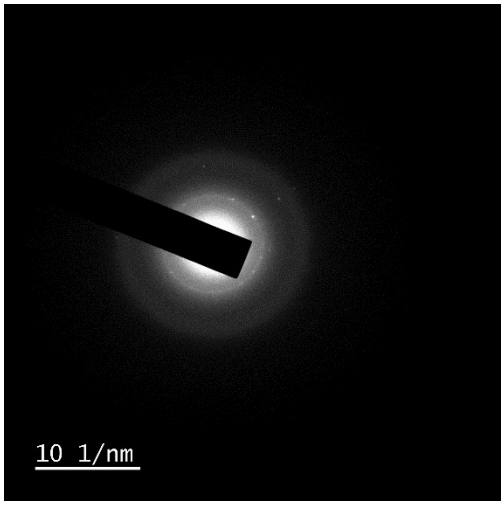


**Figure S1. SEAD Pattern of synthesized CCDs**

The selected area electron diffraction (SAED) pattern depicts diffused rings, confirming the polycrystalline structure of the synthesized CCDs[1].

### Optical Characterisation

2. **Photostability studies of CCDs**

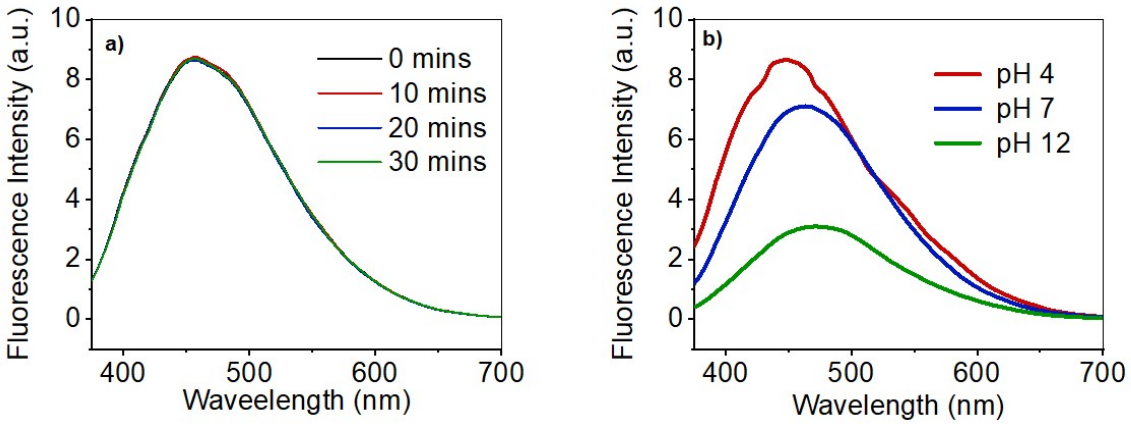


**Figure S2. (a) Florescence intensity of CCDs (a) after different irradiation time interval (b) at different pH.**

To determine the photostability of synthesized CCDs, fluorescence spectra were recorded at various time intervals and pH levels under an excitation wavelength of 350 nm. It is evident that the CCDs are stable with increasing time interval and are pH responsive. The fluorescence intensity decreases linearly with increasing pH from 4 to 12. This may be due to protonation and deprotonation of surface carboxyl groups, which induce electrostatic charging. While the emission peak consistently remains at 450 nm indicating spectral stability[1]. This suggests the

synthesized CCDs can be utilized as fluorescence-based pH sensors for applications in clinical diagnostics such as sensing tumor microenvironments etc.

**Method Validation**

3. **Fluorescence lifetime plot of CCDs incubated with varying Fe(III) concentrations.**

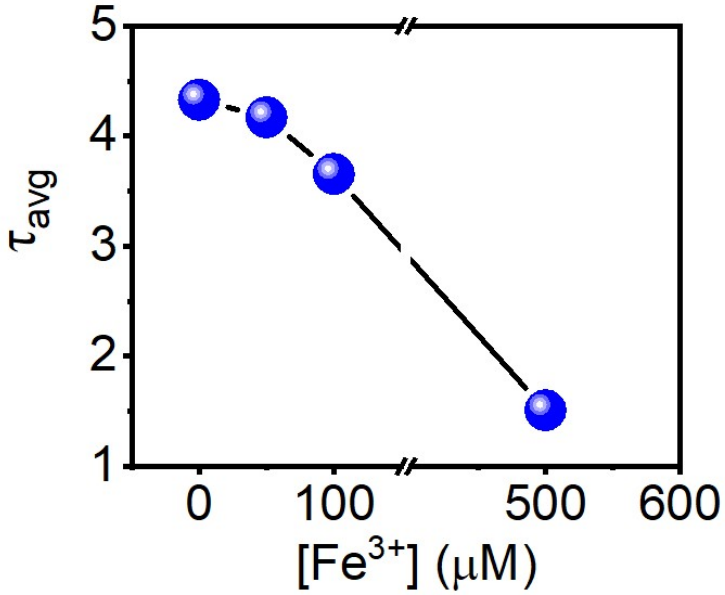


**Figure S3. The effects of different concentrations of Fe(III) ions on the fluorescence lifetime of CCDs.**

The fluorescence life of 4.33 ns, 4.17 ns, 3.655 ns and 1.51 ns were observed for 0, 50, 100 and 500 μM concentration of Fe(III) ions respectively.

4. ***In-Vitro*** **Studies**

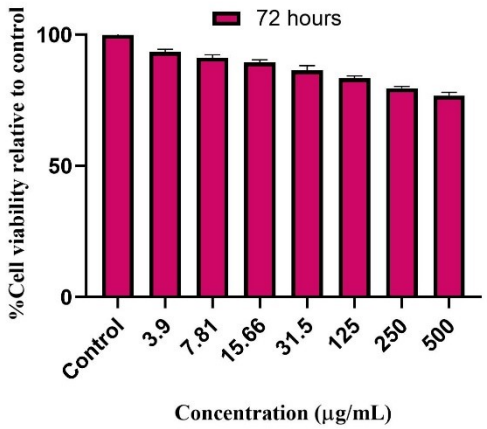


**Figure S4. *In-vitro* cytocompatibility of CCDs after 72 h.**

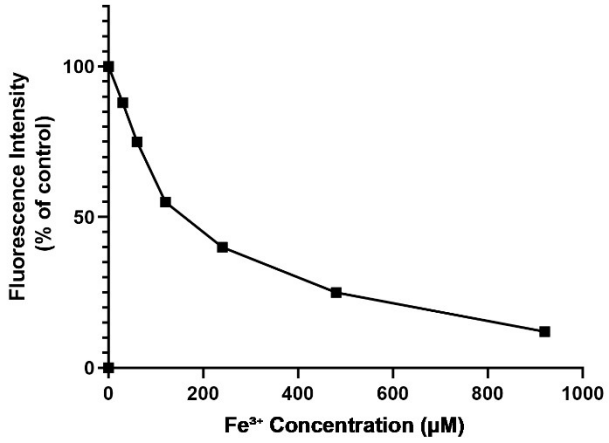


**Figure S5. Fluorescence intensity has been quantified vs $Fe^{3+}$ increasing concentration (µM)**

## Reference

1 L. A. A. Chunduri, A. Kurdekar, S. Patnaik, B. V. Dev, T. M. Rattan and V. Kamisetti, *mater focus*, 2016, 5, 55–61.