

## Supplementary Information

### Fluoride-philic reduced graphene oxide-fluorophore anion sensors

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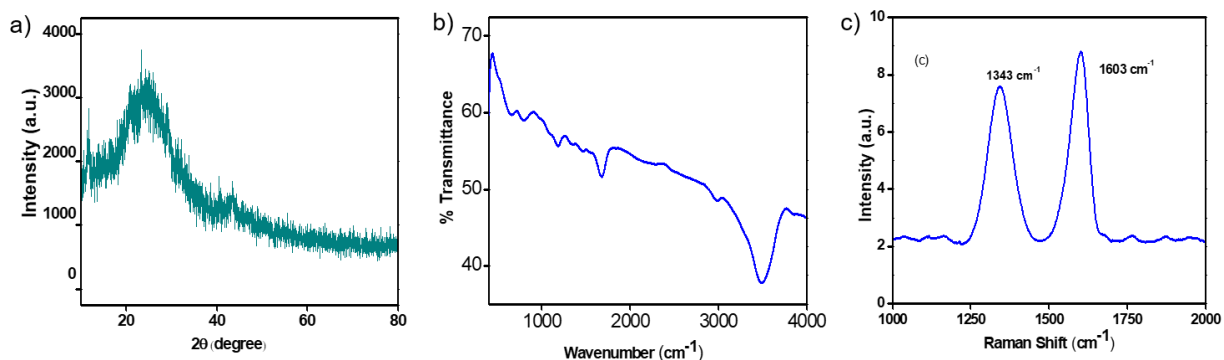
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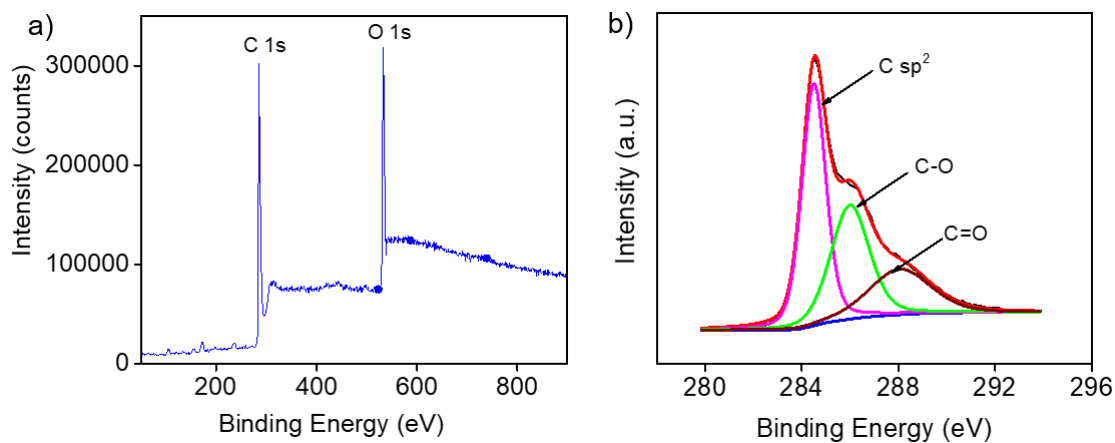
**TABLE OF CONTENTS**

1. Supplementary Figures.....	S3
Fig. S1.....	S3
Fig. S2.....	S3
Fig. S3.....	S4
Fig. S4.....	S4
Fig. S5.....	S5
Fig. S6.....	S6
Fig. S7.....	S7
2. Supplementary Information References .....	S7

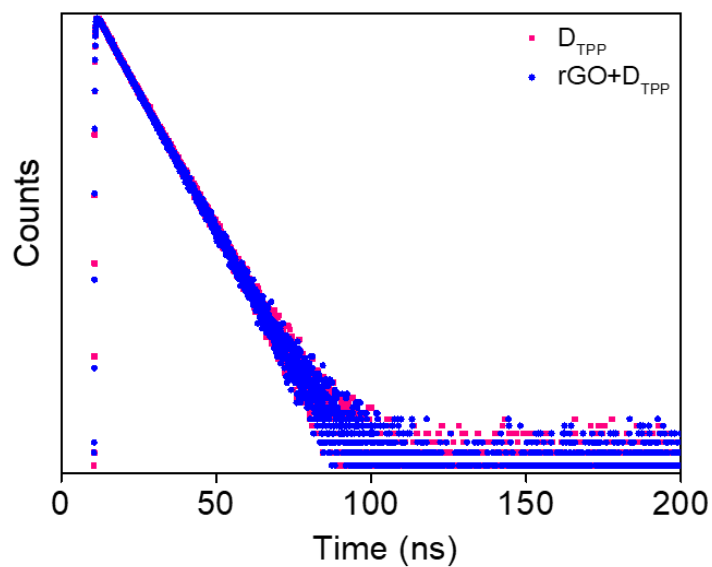
## 1. Supplementary Figures



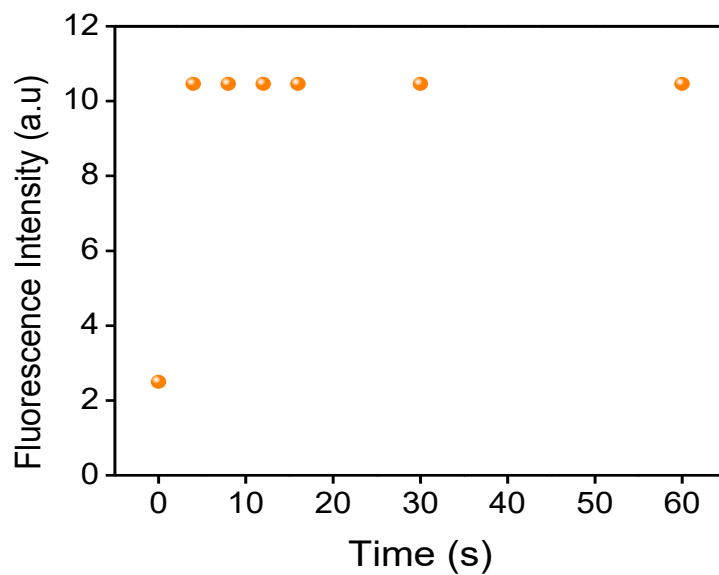
**Fig. S1** (a) XRD profile, (b) FTIR spectrum and (c) Raman spectrum of rGO. The details of synthesis, purification and characterization of RGO have been reported elsewhere.<sup>S1, S2</sup>



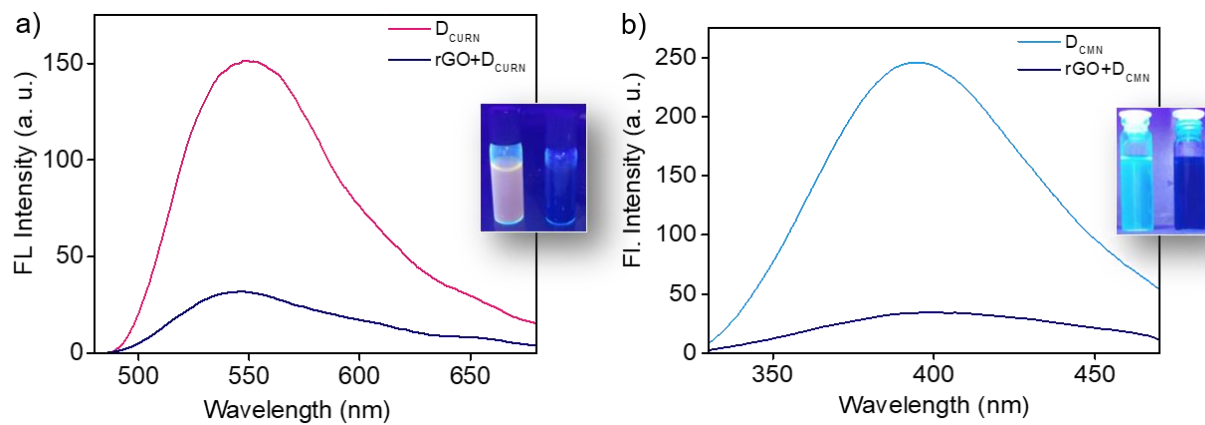
**Fig. S2** X-ray photoelectron spectrum of rGO. (a) Survey spectrum and (b) C 1s spectrum.



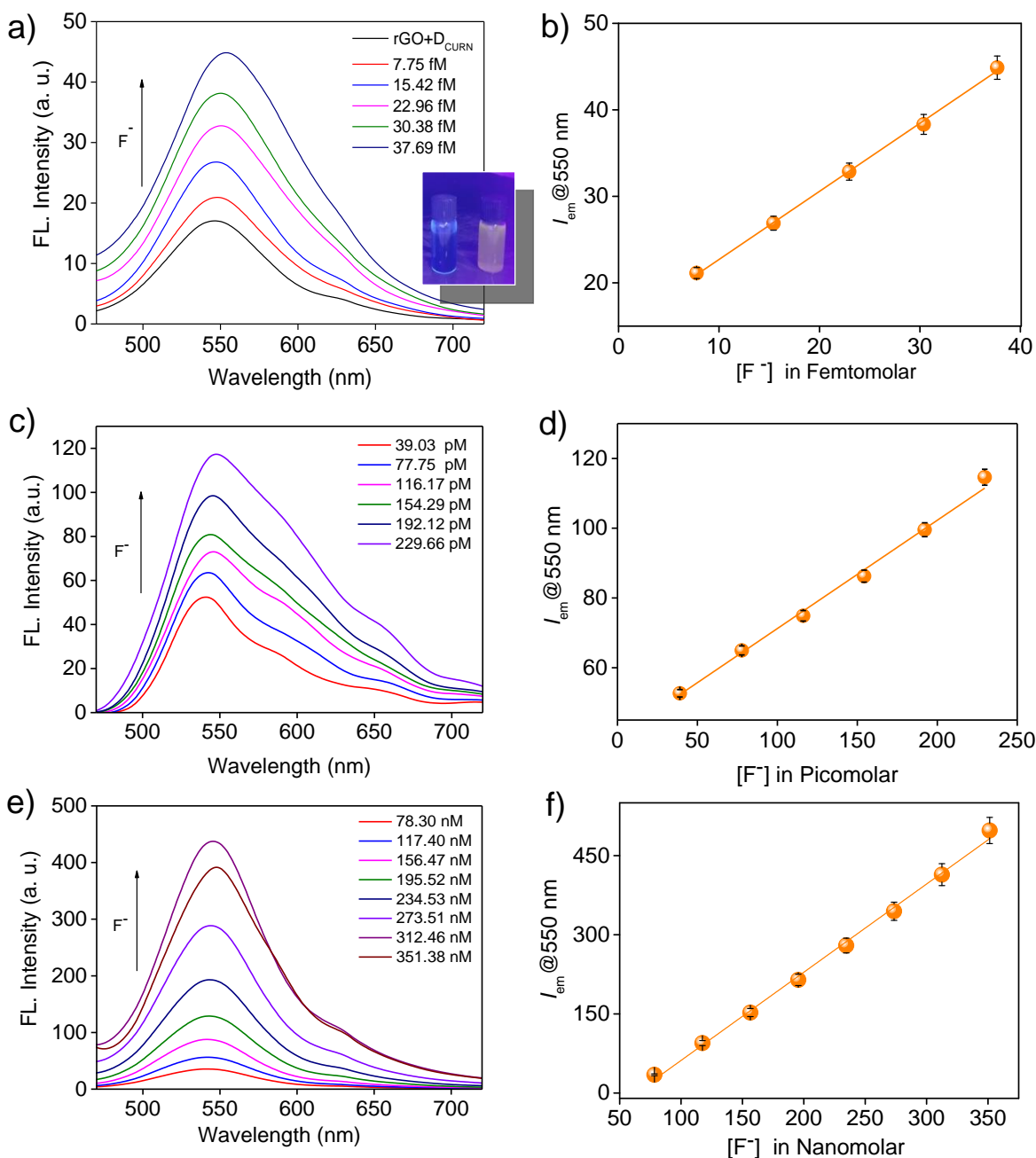
**Fig. S3** Fluorescence lifetime decay profiles of  $D_{\text{TPP}}$  and  $r\text{GO}-D_{\text{TPP}}$ ,  $\lambda_{\text{em}} = 655$  nm.



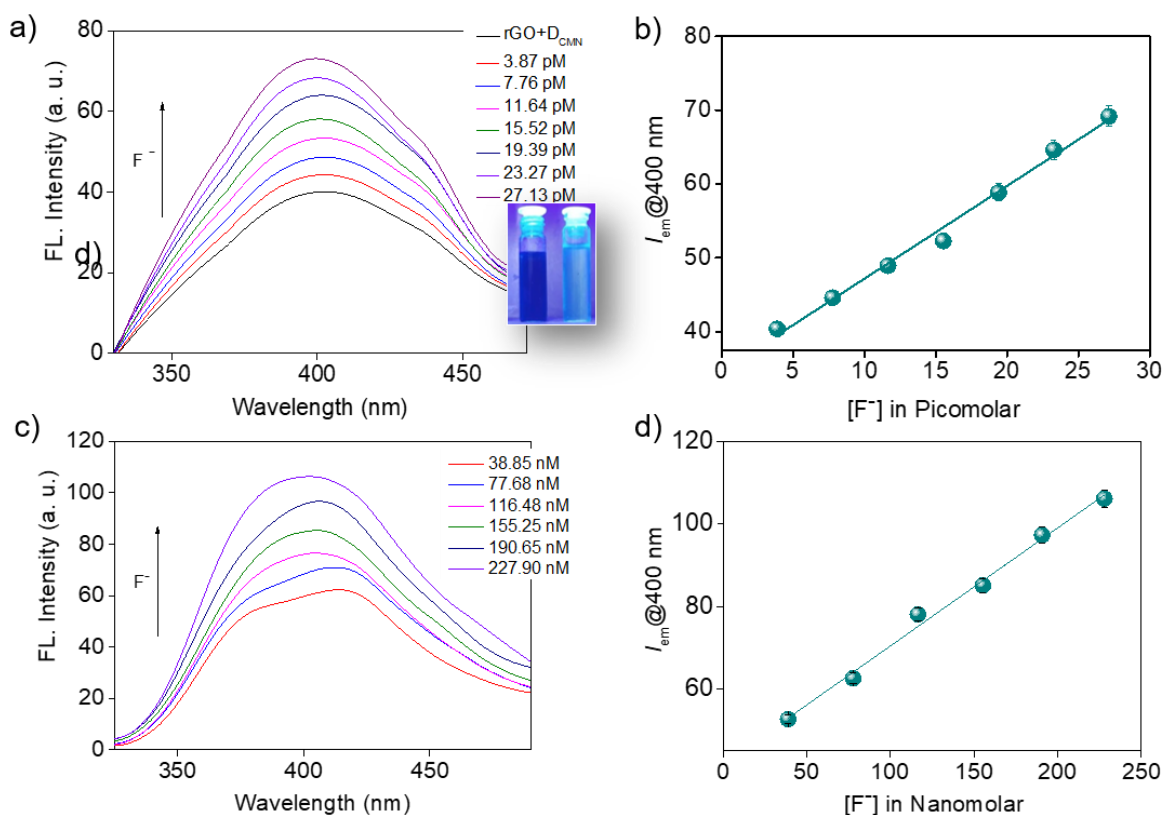
**Fig. S4.** Time dependent Fluorescence intensity of  $r\text{GO}-D_{\text{TPP}}$  after the addition of fluoride ions (38.85 aM).



**Fig. S5** Quenching of fluorescence of dyes in the presence of rGO (40  $\mu$ L). (a)  $D_{CURN}$  ( $10^{-12}$  M,  $\lambda_{ex}$  = 400 nm) and (b)  $D_{CMN}$  ( $10^{-12}$  M  $\lambda_{ex}$  = 265 nm). The insets show the respective images of solutions before and after the addition of rGO under 365 nm UV illumination.



**Fig. S6** Restoration of quenched fluorescence of **rGO-D<sub>CURN</sub>** on adding F<sup>-</sup> ions in (a) femtomolar (c) picomolar and (e) nanomolar concentration level ( $\lambda_{\text{ex}} = 400 \text{ nm}$ ). (b, d, f) Plot showing the variation of fluorescence response ( $\lambda_{\text{em}} @ 545 \text{ nm}$ ) with the concentration of F<sup>-</sup> ions. Insets of Fig. S5a showing photographs of **rGO-D<sub>CURN</sub>** (D<sub>CURN</sub>:  $10^{-12} \text{ M}$ , rGO:  $40 \mu\text{L}$ ) aqueous solution in the absence and presence of F<sup>-</sup> ions ( $15^{-15} \text{ M}$ ) under illumination with 365 nm UV light.



**Fig. S7** Restoration of quenched fluorescence of rGO-D<sub>CMN</sub> on adding F<sup>-</sup> ions in (a) picomolar and (c) nanomolar concentration level ( $\lambda_{ex} = 265\text{ nm}$ ). (b and d) Plot showing the variation of fluorescence response ( $\lambda_{em}@396\text{ nm}$ ) with the concentration of F<sup>-</sup> ions. Insets of Fig. S6a showing photographs of rGO-D<sub>CMN</sub> (D<sub>CMN</sub>:  $10^{-12}\text{ M}$ , rGO:  $40\text{ }\mu\text{L}$ ) aqueous solution in the absence and presence of F<sup>-</sup> ions ( $10^{-12}\text{ M}$ ) under illumination with 365 nm UV light.

## 2. Supplementary Information References

S1. A. K. Akhila and N. K. Renuka., *New J. Chem.*, 2019, **43**, 1001–1008;

S2. A. K. Akhila, A. R. Suresh Babu, A. A. Anappara and N. K. Renuka. *Spectrochim. Acta, Part A*, 2022, **266**, 120408.