

## SUPPORTING INFORMATION

For

### **Modified perylene diimide for *femto* molar level detection of glucose: Smartphone assisted colorimetric glucose detection kits**

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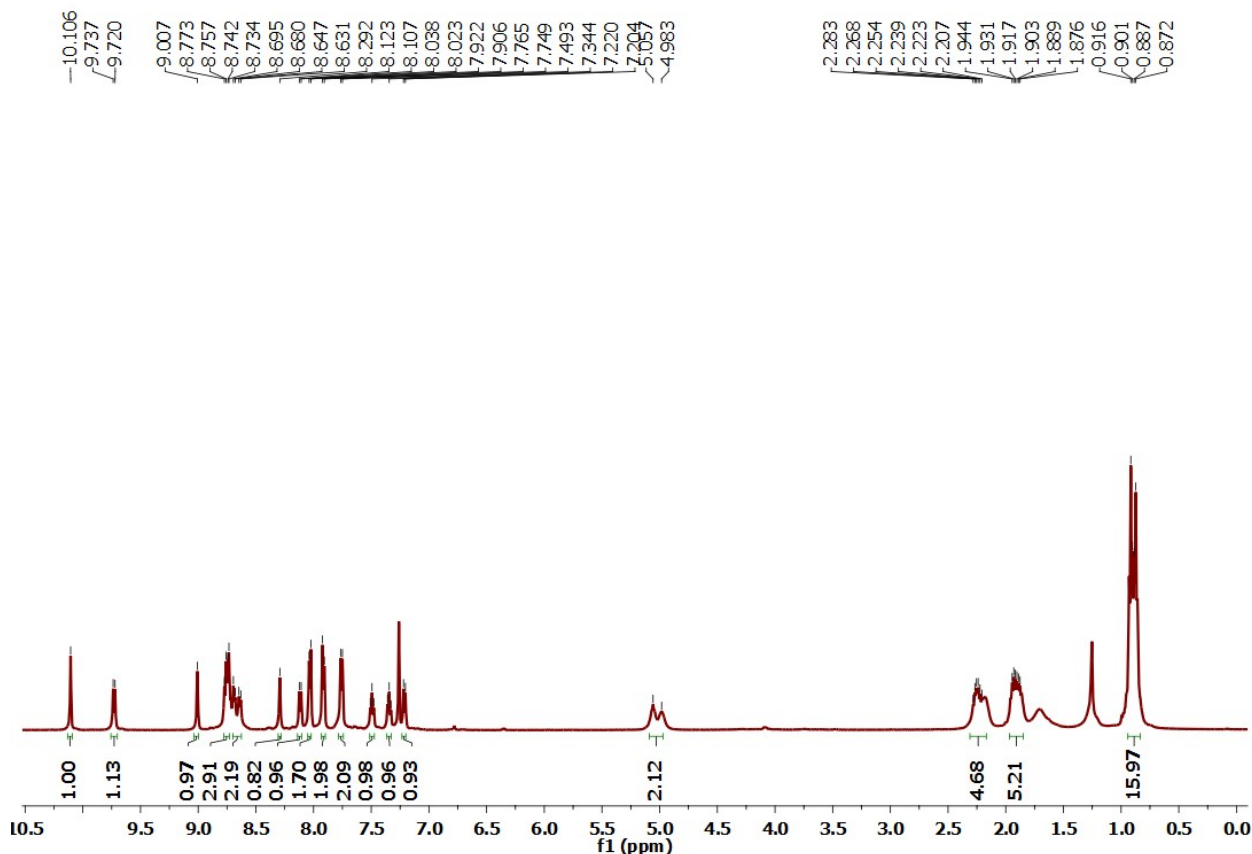


Figure S1. <sup>1</sup>H NMR spectrum of PH1.

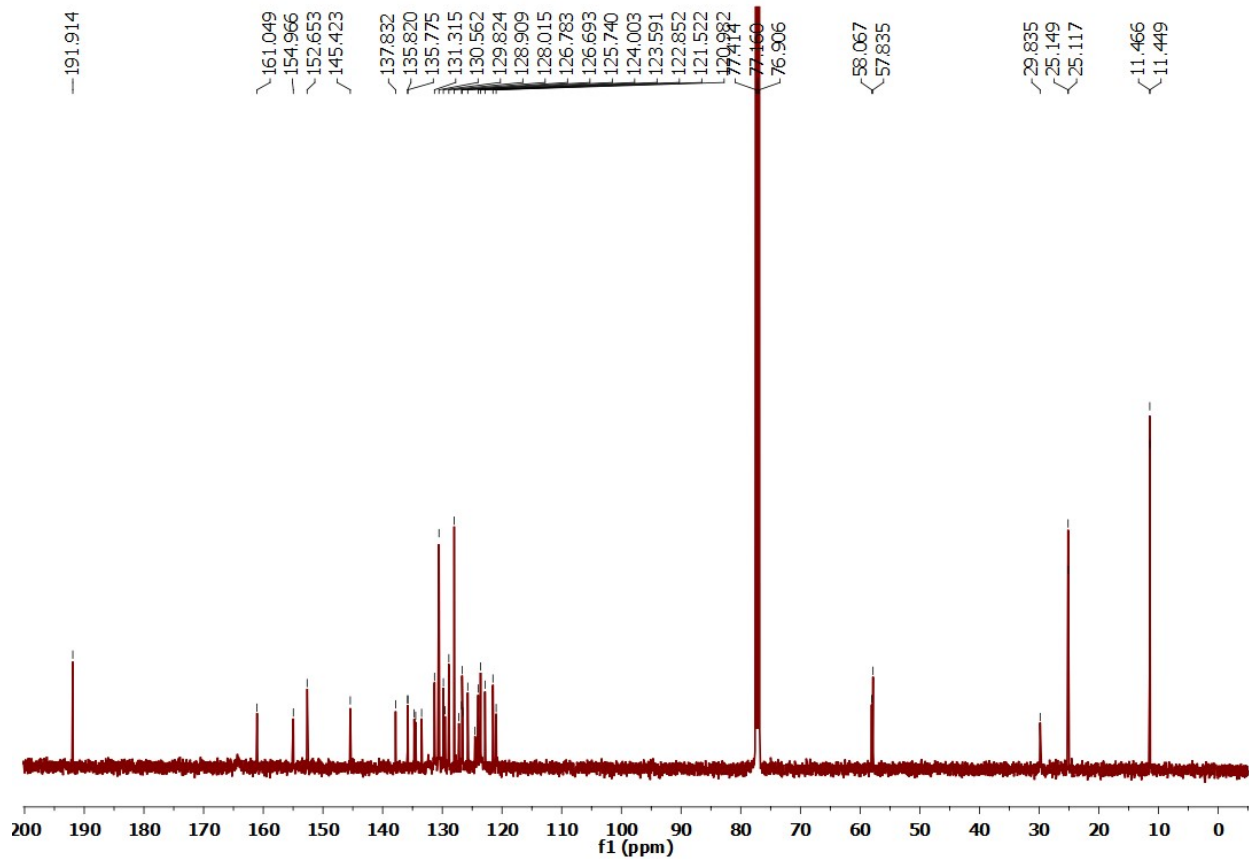


Figure S2.  $^{13}\text{C}$  NMR spectrum of PH1.

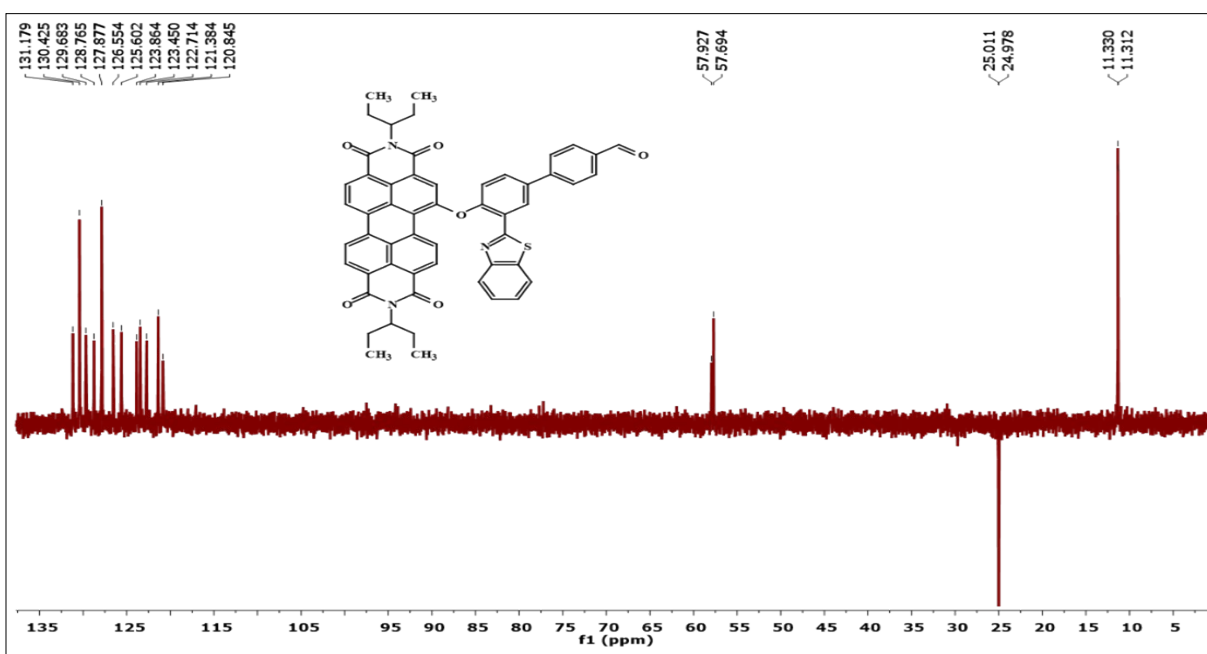


Figure S3.  $^{13}\text{C}$  DEPT NMR spectrum of PH1.

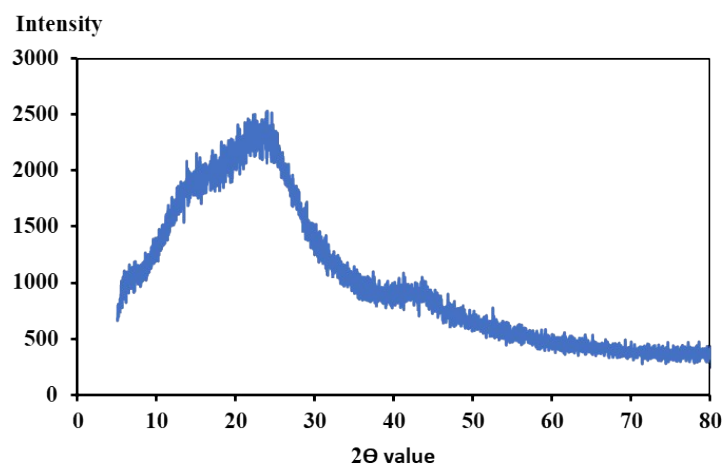


Figure S4: XRD spectrum of PH1.

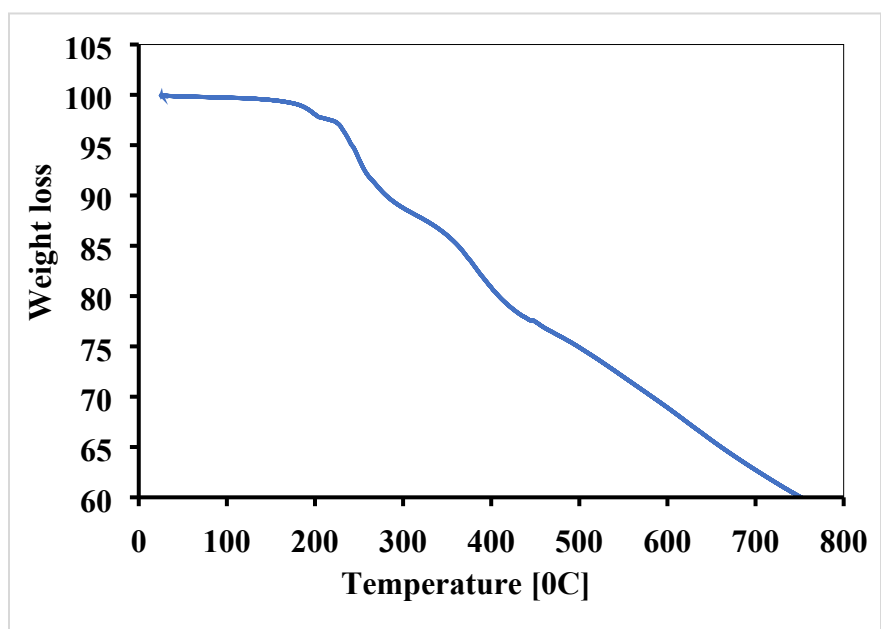
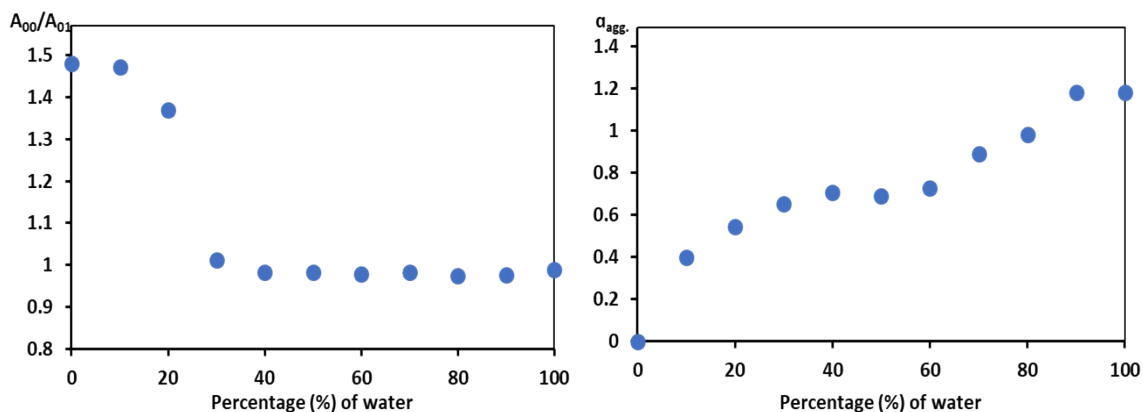
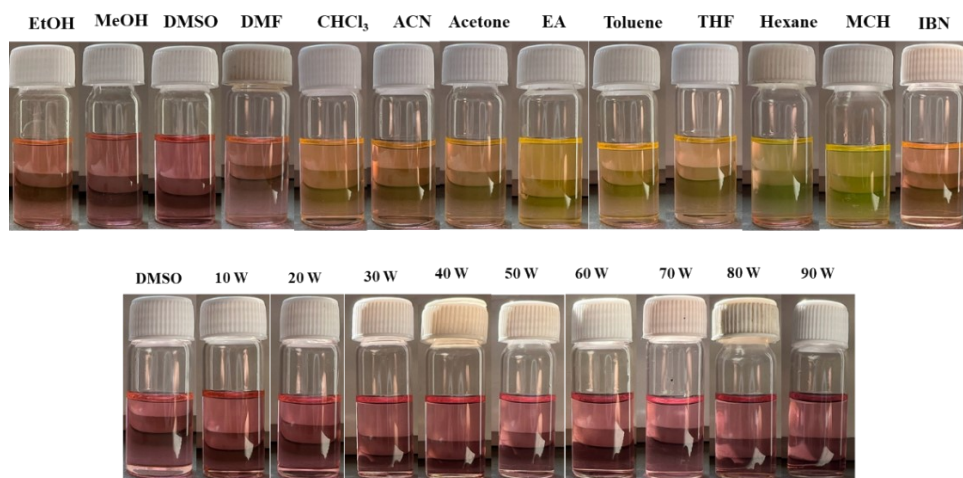


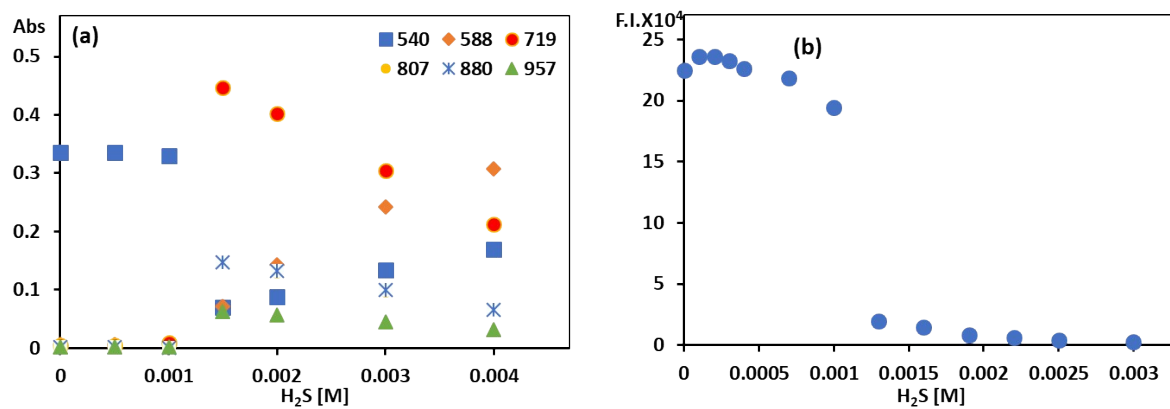
Figure S4a: TGA graph of PH1



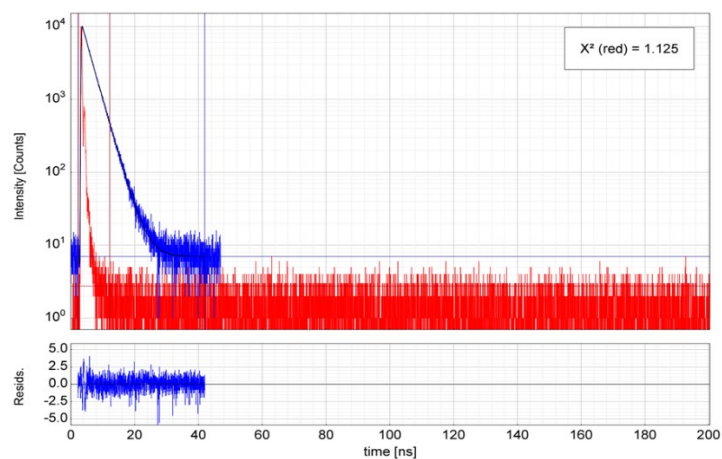
**Figure S5.** Plot of (left)  $A_{0-0}/A_{0-1}$  and (right) degree of aggregation ( $\alpha_{agg}$ ) versus percentage of water in a DMSO.



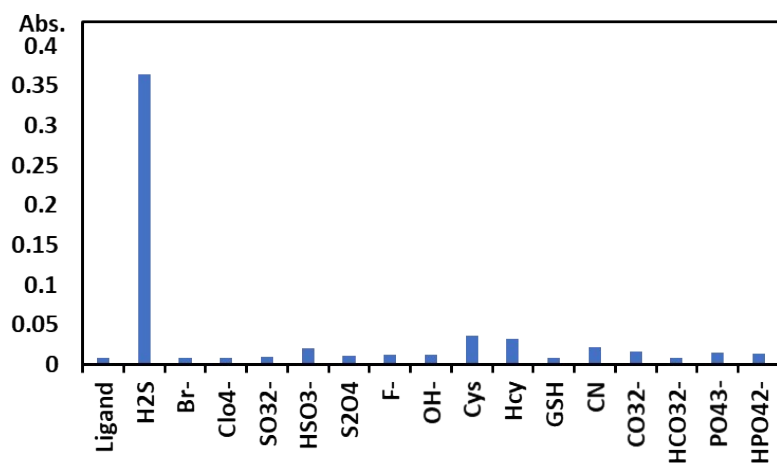
**Figure S6.** Daylight photographs of PH1 (10  $\mu$ M) in (top) different polarity solvents and (bottom) upon addition of different water fractions in DMSO.



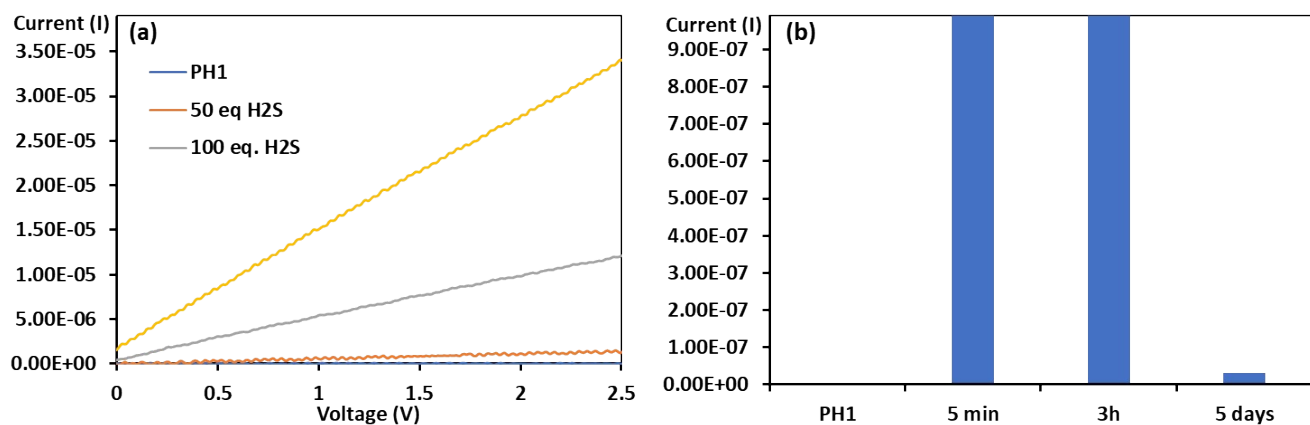
**Figure S7.** (a) Absorbance (at different wavelengths) and (b) emission plot of PH1 upon addition of different concentrations of  $H_2S$ .



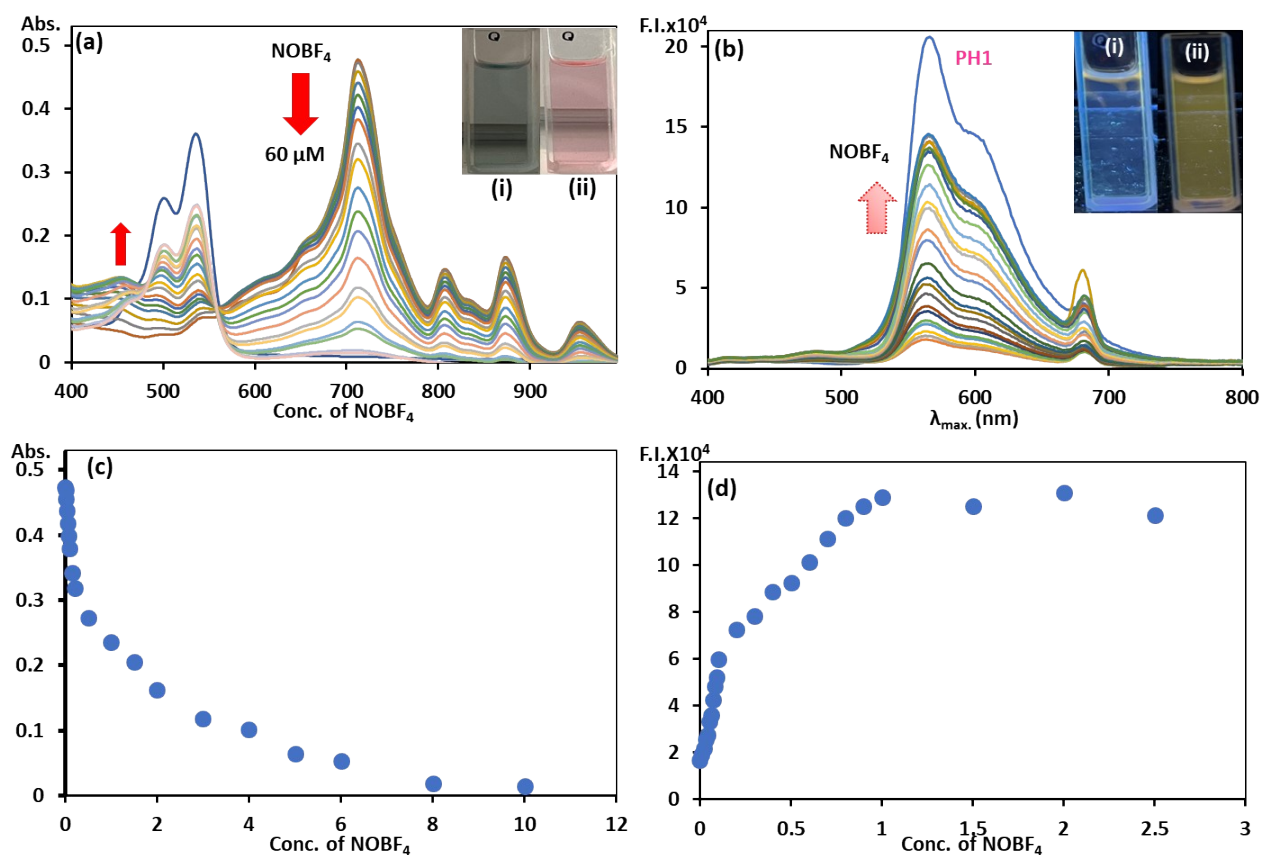
**Figure S8:** The fluorescence lifetime of PH1.



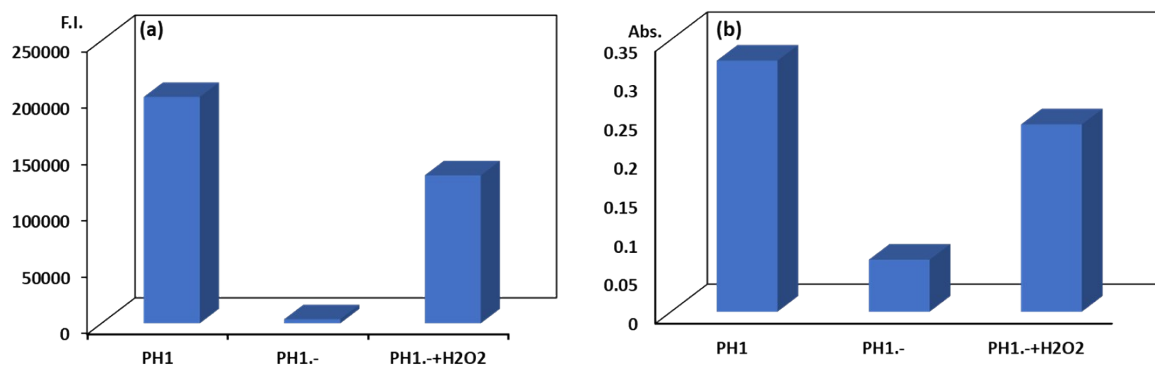
**Figure S9.** Bar graph of PH1 (10  $\mu$ M) upon addition of 1mM concentration of different anions.



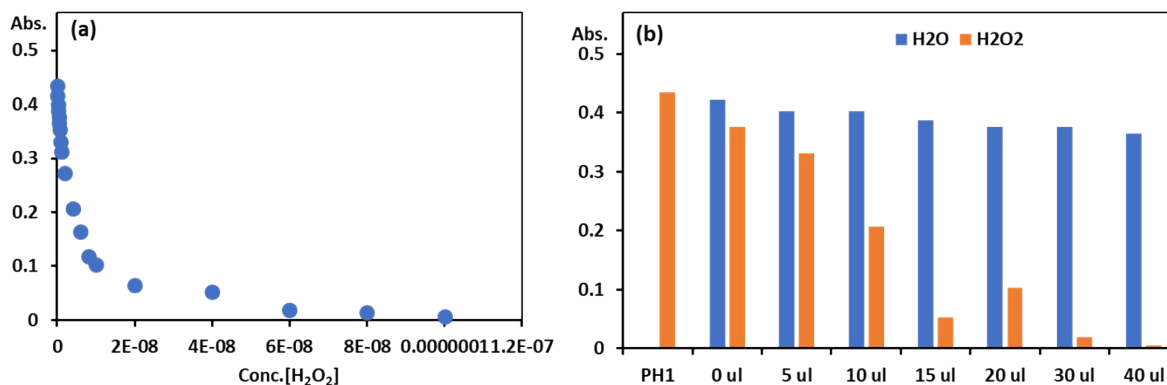
**Figure S10.** (a) I-V plot of PH1 (10  $\mu$ M) upon addition of H<sub>2</sub>S. (b) Bar graph of I-V plot showing stability of PH1<sup>-</sup> radical anion after different interval of time.



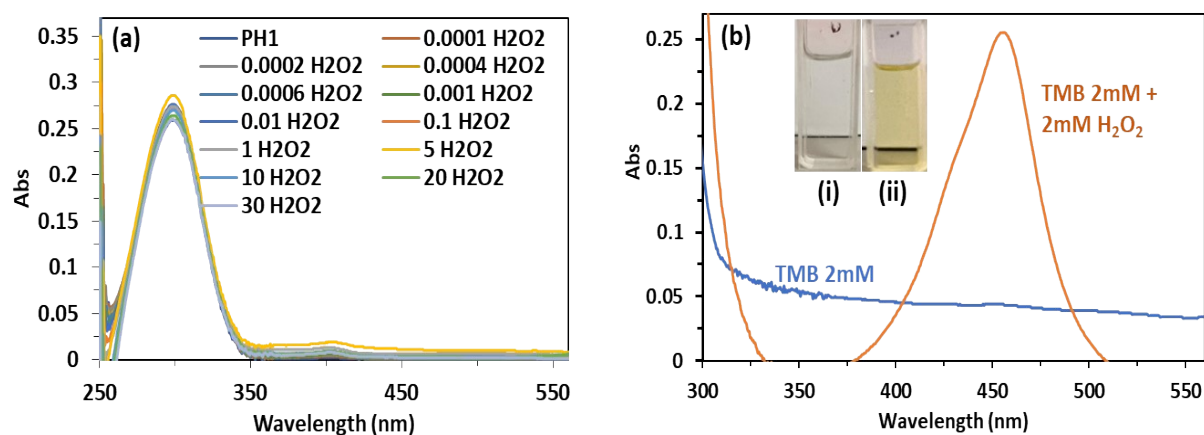
**Figure S11:** (a) Absorbance and (b) Emission spectra of  $\text{PH1}^-$  (generated in-situ upon addition of 1mM of  $\text{H}_2\text{S}$ ) upon addition of different concentration of  $\text{NOBF}_4$ ; [Insets of (a) and (b)] colour change photographs of  $\text{PH1}^-$  upon addition of 100  $\mu\text{M}$  concentrations of  $\text{NOBF}_4$ . Plots of (c) Absorbance (d) emission intensity versus concentration of  $\text{NOBF}_4$  to calculate the lowest limit of detections.



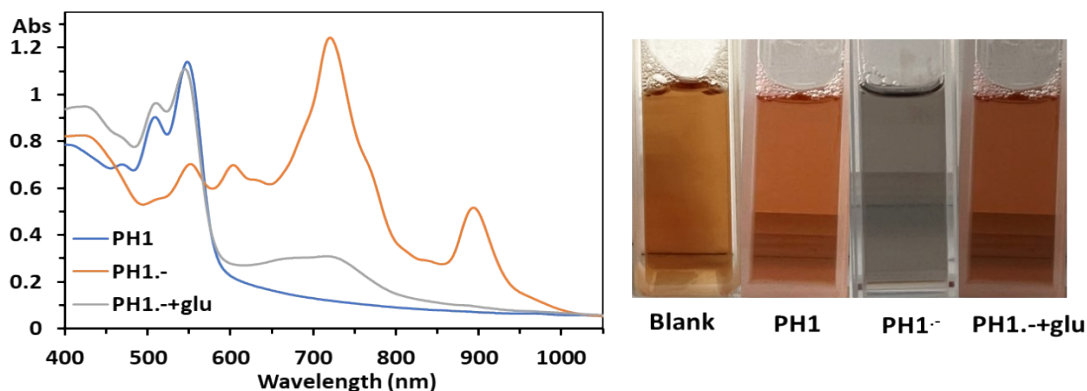
**Figure S12.** Bar graph showing revival of (a) emission (b) absorbance intensity upon addition of  $\text{H}_2\text{O}_2$  to  $\text{PH1}^-$  radical anion



**Figure S13.** (a) Plot of absorbance intensity versus concentration of  $H_2O_2$  and (b) Bar graph of  $PH1^-$  (generated in-situ upon addition of 1 mM of  $H_2S$ ) showing interference of water upon addition of  $H_2O_2$ .



**Figure S14:** (a,b) Absorbance spectrum of 3,3',5,5'-tetramethylbenzidine (TMB) upon addition of different concentration of  $H_2O_2$ .



**Figure S15:** The absorbance spectra of PH1 upon addition of  $H_2S$ , glucose oxidase and glucose in the whole blood.

**Table S1:** The comparison of PDI-based material with other materials.

<b>Citation</b>	<b>Radical anion</b>	<b>Solvent mixture</b>	<b>Analytes</b>	<b>LOD(M)</b>	<b>Application</b>
Present manuscript	<b>YES</b>	20% HEPES Buffer	H <sub>2</sub> O <sub>2</sub> / Glucose/	170 fM/ 85 fM/	Biochemical assay
Dyes and Pigments 165 (2019) 319–326	Yes	NMP	Ag <sup>+</sup>	0.05 mol/L	NA
Chem. Commun., 2023, 59, 12775	No	60% PBS buffer	H <sub>2</sub> O <sub>2</sub>	1.37 μM	Live cell
ACS Appl. Mater. Interfaces 2023, 15, 39–47	No	1% PBS	H <sub>2</sub> O <sub>2</sub>	87 nM	In-vivo, In-vitro imaging
Sensors and Actuators: B. Chemical 406 (2024) 135452	No	1% PBS	H <sub>2</sub> O <sub>2</sub> (in presence of Aβ42 fibrils)	38.8 nM	In-vivo, In-vitro imaging



Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 304 (2024) 123394	No	70% PBS buffer	H <sub>2</sub> O <sub>2</sub>	3.01 μM	In cells
ACS Omega 2021, 6, 14819–14823	No	PBS Buffer	H <sub>2</sub> O <sub>2</sub>	0–200 μM	NA
Talanta 269 (2024) 125459	No	PBS buffer	H <sub>2</sub> O <sub>2</sub>	25.2 nM	In-vivo, in-vitro imaging
Talanta 271 (2024) 125669	No	EtOH/PB solution (1:1, v/v)	H <sub>2</sub> O <sub>2</sub>	62 nM	In-vivo, in-vitro imaging