# Electronic Supplementary Information

## Dual-emissive polystyrene@zeolitic imidazolate framework-8 composite for ratiometric detection of singlet oxygen

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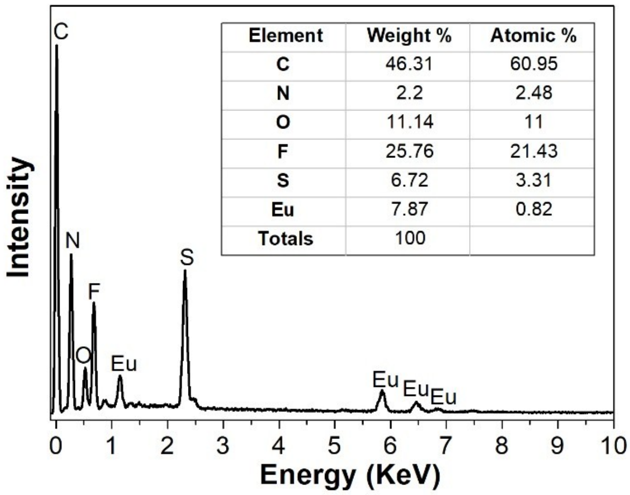


Figure S1. EDS spectrum of EuPS.

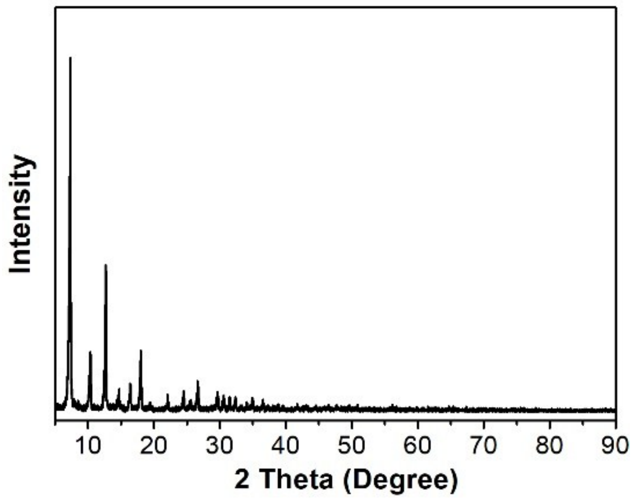


Figure S2. XRD pattern of EuPS@AnC/ZIF-8.

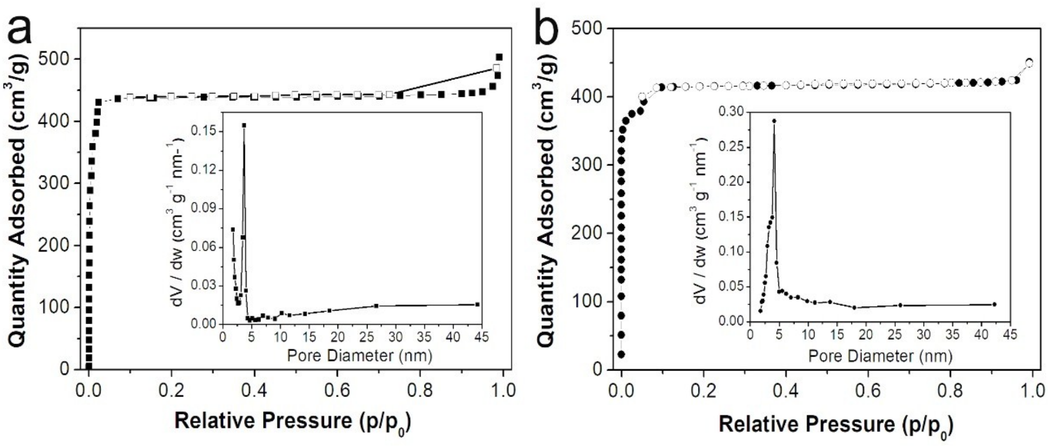


Figure S3. $N_2$ adsorption-desorption isotherms of EuPS@ZIF/8 (a) and EuPS@AnC/ZIF-8 (b). Insets are their corresponding pore size distributions.

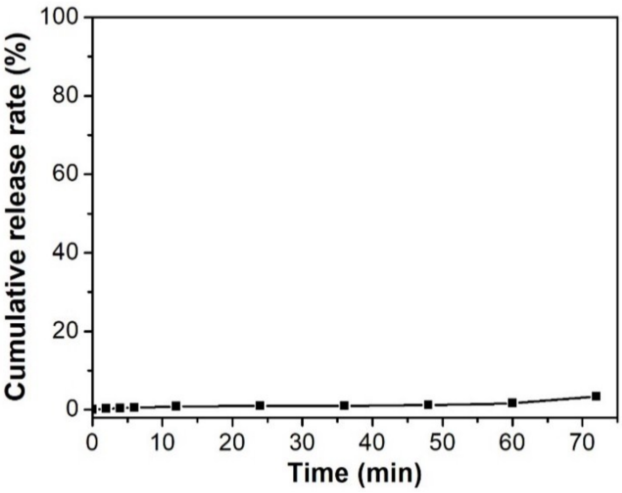


Figure S4. The AnC release profile from EuPS@AnC/ZIF-8 in Tris-HCl buffer (10 mM, pH 8.5).

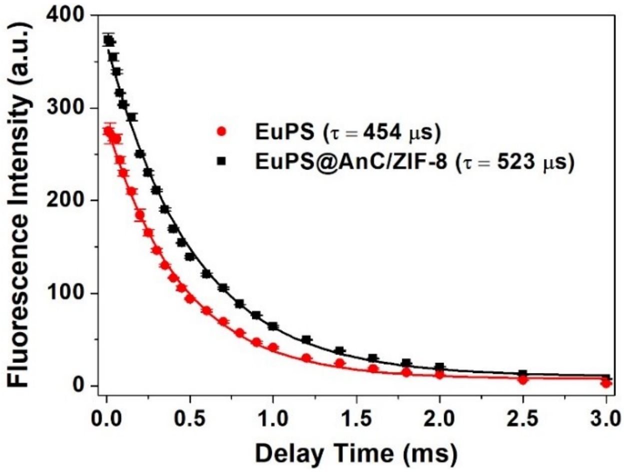


Figure S5. Emission lifetimes of EuPS and EuPS@AnC/ZIF-8.

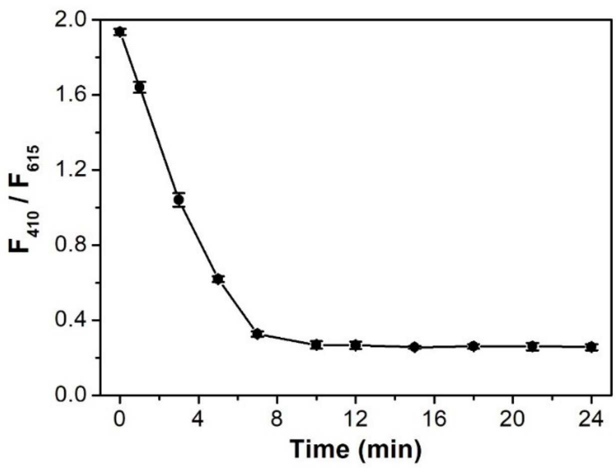


Figure S6. Time-dependent $F_{410}/F_{615}$ changes of EuPS@AnC/ZIF-8 in the presence of 300 μM of $^1O_2$.

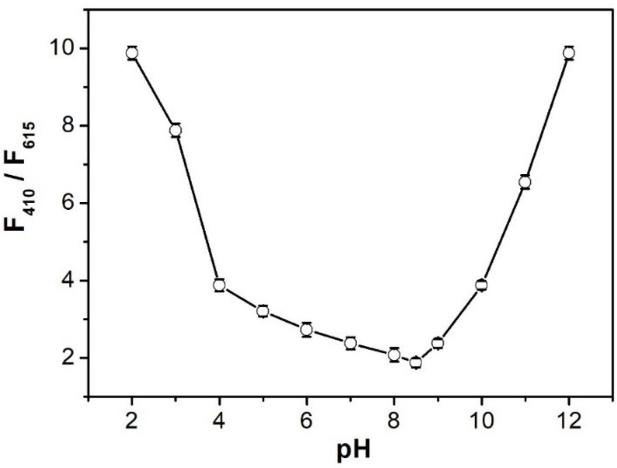


Figure S7. Effects of pH on the fluorescence of EuPS@AnC/ZIF-8.

Table S1. Comparison of various sensors for $^1O_2$ detection

| **Sensors** | **Analytic methods** | **Traps** | **Detection limit (nM)** | **Ref** |
|---|---|---|---|---|
| Thiafulvalene derivative | Chemiluminescence | Anthracene | 76 | 1 |
| Tetrathiafulvalene-anthracene dyad | Chemiluminescence | Anthracene | 1000 | 2 |
| Europium chelate | Fluorescence | Anthracene | 3.8 | 3 |
| Anthryl appended porphyrin | Fluorescence | Anthracene | 240 | 4 |
| Ru(II)-bipyridine derivative | Fluorescence | Anthracene | 170 | 5 |
| Cyanine derivative | Fluorescence | Histidine | 7.9 | 6 |
| Rhodamine-anthracene compound | Fluorescence | Anthracene | 3220 | 7 |
| Europium-based porous silicon | Fluorescence | Anthracene | 37 | 8 |
| EuPS@AnC/ZIF-8 | Fluorescence | Anthracene | 43 | This work |

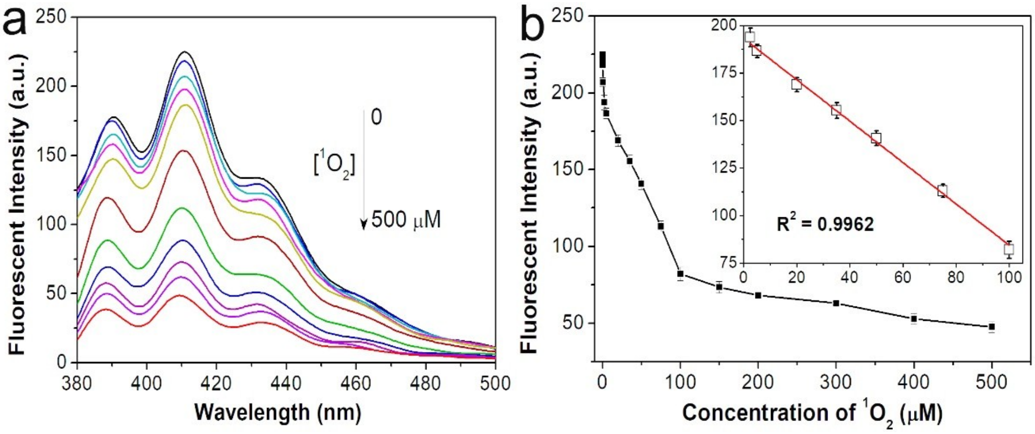


Figure S8. Emission spectra (a) and fluorescent intensity at 410 nm (b) of AnC in the presence of $^1O_2$ with different concentrations. Inset is the linear calibration plots of fluorescent intensity of AnC at 410 nm against $^1O_2$ concentrations.

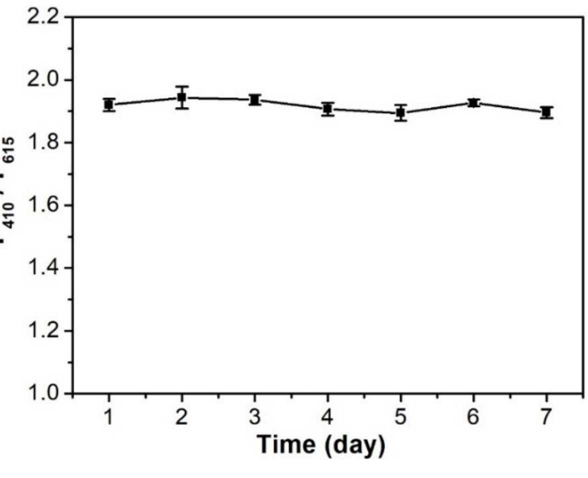


Figure S9. The $F_{410}/F_{615}$ changes of EuPS@AnC/ZIF-8 after storing different times at room temperature.

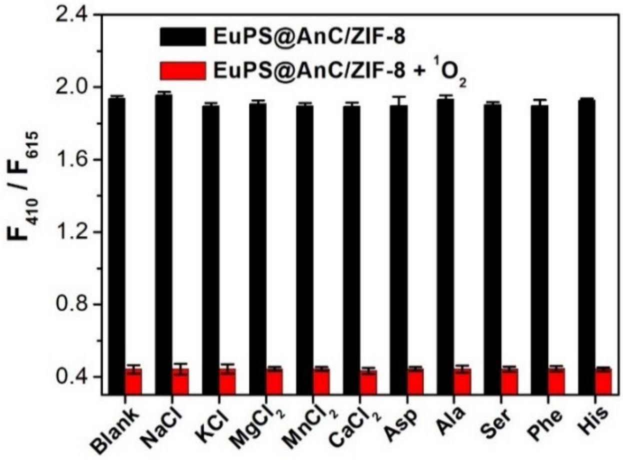


Figure S10. The changes of the $F_{410}$/ $F_{615}$ of EuPS@AnC/ZIF-8 in the presence of $^1O_2$ and interferential substances (each 200 μM). Black bars represent the addition of interferential substance (200 μM); Red bars represent the addition of interferential substance (200 μM) and $^1O_2$ (200 μM) together.

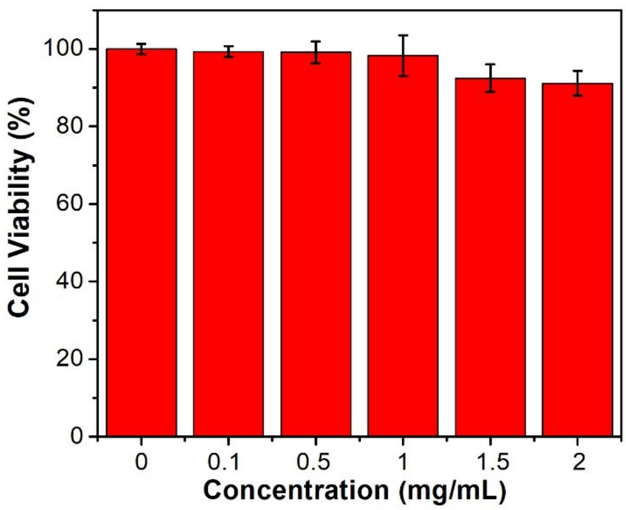


Figure S11. Viability of HeLa cells after incubation with different concentrations of EuPS@AnC/ZIF-8 for 24 h.

Table S2. Determination of $^1O_2$ in serum samples.

| Samples | Added (μM) | Detected (μM) | Recovery (%) | RSD (%, n = 5) |
|---|---|---|---|---|
| 1 | 5 | 4.96 | 99.13 | 2.29 |
| 2 | 20 | 21.93 | 109.65 | 3.69 |
| 3 | 50 | 54.45 | 108.90 | 3.70 |

**References:**


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