Electronic Supplementary information

Morphological tuning of Eu$_2$O$_2$S nanoparticles, manifestation of peroxidase-like activity and use in glucose assay

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**Fig S1.** FTIR spectra of single source precursor complex [(Et$_3$NH)$_3$Eu(acda)$_4$].

**Fig S2.** UV-vis absorption spectra of precursor complex [(Et$_3$NH)$_3$Eu(acda)$_4$].

**Fig S3.** Thermogravimetric analysis (TGA) of precursor complex [(Et$_3$NH)$_3$Eu(acda)$_4$].

**Fig S4.** FTIR spectra of Eu$_2$O$_2$S nanoplate, nanosphere and rod-like nanoparticles.

**Fig S5.** Particle size distribution plot for Eu$_2$O$_2$S hexagonal nanoplate.

**Fig S6.** FESEM images of Eu$_2$O$_2$S nanoplate: (a) low magnification, (b) high magnification (Inset: hexagonal morphology is obtained in FESEM analysis.

**Fig S7.** Room temperature excitation spectra of Eu$_2$O$_2$S nanoparticles: (a) nanoplates, (b) nanosphere, (c) nanorod-like particles.

**Fig S8.** Time dependent Uv-vis spectral changes of TMB-H$_2$O$_2$ system catalyzed by Eu$_2$O$_2$S nanoplates. Inset: Change of color before and after the oxidation of TMB.
**Fig S9.** Effect of (a) pH and (b) temperature on the peroxidase like activity.

**Fig S10.** Steady-state kinetic study using the Michaelis-Menten model and Lineweaver-Burk model (insets) for commercially available Eu₂O₃ by (a) varying the concentration of H₂O₂ with fixed amount of TMB and (b) varying the concentration of TMB with fixed amount of H₂O₂.

**Fig S11.** The Effect of nanoparticles in the formation of hydroxyl radical with terephthalic acid as photoluminescence probe: in presence of (a) Eu₂O₂S and (b) Eu₂O₃.

**Fig S12.** Selectivity test in glucose detection. Bar diagram for the spectrophotometric response of TMB at 653 nm in presence of glucose oxidase for the addition of (i) 0.5 mM glucose, (b) 5 mM fructose, (c) 5 mM maltose, (d) 5 mM lactose.

![Graph showing the spectrophotometric response of TMB at 653 nm.](image)

**Fig. S1**
Fig. S4

Fig. S5
Fig. S6

Fig. S7
Fig. S10

Fig. S11
Fig. S12