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#### **Electronic Supplementary Information (ESI)**

## An environmental-friendly AIE probe for the CMC determination

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#### **1.1 Materials and General Methods**

Unless especially stated, all chemicals were purchased from commercial suppliers in analytical grade and used without further purification. Water used in all experiments was purified via deionization and filtration with Millipore purification apparatus to the resistivity higher than 18 M $\Omega$  cm<sup>-1</sup>. Fluorescence spectra measurements were performed on a Varian Cary Eclipse fluorescence spectrophotometer. Dynamic light scattering (DLS) experiments were conducted with Zetasizer Nano-ZS (Malvern Instruments, Worcestershire, UK). Transmission electron microscopy (TEM) images were taken on JEOL JEM-1400 instrument.

## **1.2 Cytotoxicity assay**

MTT assays were used to assess the cell viability of EDS. HeLa cells were seeded in a 96-well culture at the density of  $5 \times 10^3$  per well, and these cells were cultured at 37 °C with humidified 5% CO<sub>2</sub> for 12 h. The culture medium was replaced with 100 µL fresh medium containing different concentration of EDS (40, 30, 25, 20, 15, 10, 0 µM), and further incubating these cells for 24 h. After that, MTT solution (10 µL, 5 mg mL<sup>-1</sup>) was put into each sample and cultivated for additional 2 h. Finally, the absorption intensity at 600 nm was read by an enzyme-linked immunosorbent assay plate.

The cell viability (%) =  $(OD_{sample} - OD_{blank})/(OD_{control} - OD_{blank}) \times 100\%$ .

OD<sub>sample</sub>: the Hela cells was incubated with probe EDS;

OD<sub>control</sub>: the Hela cells without incubated probe EDS;

OD<sub>blank</sub>: the Hela cells containing only the culture media;

Every assay was repeated three times and six parallel samples were tested in every group.

# 2.1. CMC determination of SDS, SDBS, F127 and AEO-3 in aqueous solutions by EDS

a) Preparation of the stock solution of EDS (250  $\mu$ M): 3.0 mg of EDS (Mr = 482.53) was added into a 25 mL volumetric flask and dissolved by about 10 mL distilled water, then filling the flask to the mark with doubly distilled water.

b) Preparation of concentrated SDS solution (10 mM): 288.0 mg of SDS (Mr = 288.38) was added into a 100 mL volumetric flask and dissolved by about 50 mL distilled water, then filling the flask to the mark with doubly distilled water.

c) Preparation of concentrated SDBS solution (4.5 mM): 1.5679 g of SDBS (Mr = 348.48) was added into a 100 mL volumetric flask and dissolved by about 50 mL distilled water, then filling the flask to the mark with doubly distilled water.

d) Preparation of concentrated F127 solution (10 mg/mL): 1.0000 g of F127 was added into a 100 mL volumetric flask and dissolved by about 50 mL distilled water, then filling the flask to the mark with doubly distilled water.

e) Preparation of concentrated AEO-3 solution (10 mM): 318.6 mg of AEO-3 (Mr = 318.56) was added into a 100 mL volumetric flask and dissolved by about 50 mL distilled water, then filling the flask to the mark with doubly distilled water.

f) Preparation of different concentrations of SDS, SDBS, F127 and AEO-3 solutions containing EDS (25  $\mu$ M), respectively.

As described in Table S1, at room temperature  $(25\pm1^{\circ}C)$ , different volumes of surfactant solutions were added in different 10 mL volumetric flasks, respectively. Then, 1 mL of EDS stock solution (250  $\mu$ M) was added into these flasks, respectively, filling the flask to the mark with distilled water.

Entry	1	2	3	4	5	6	7	8	9	10	11
SDS (mL)	4	5	6	6.5	7	7.5	8	9			
SDS (mM)	4	5	6	6.5	7	7.5	8	9			
SDBS (mL)	0.8	1.2	1.6	2	2.2	2.4	2.6	2.8	3.2	3.6	4
SDBS (mM)	0.36	0.54	0.72	0.9	0.99	1.08	1.17	1.26	1.44	1.62	1.8
F127 (mL)	0.05	0.1	0.2	0.5	1	1.5	2	4	8		
F127 (mg/mL)	0.05	0.1	0.2	0.5	1	1.5	2	4	8		
AEO-3 (mL)	0.25	0.5	1	1.2	1.4	1.6	1.8	2	2.5		
AEO-3 (mM)	0.25	0.5	1	1.2	1.4	1.6	1.8	2	2.5		
EDS (mL)	1	1	1	1	1	1	1	1	1	1	1
EDS (µM)	25	25	25	25	25	25	25	25	25	25	25

Table S1 Preparation of different concentrations of surfactant solutions

# 2.2. CMC determination of SDS, SDBS and F127 by pyrene

Transfer 1 mL of pyrene acetone solution (6  $\mu$ M) into 10 mL volumetric flasks and heated slightly until the solvent evaporates completely. Then, different volumes of aforementioned surfactant solutions were added, respectively (see Table S2). Filling the flask to the mark with distilled water and the solution was incubated overnight at 37 °C for fluorescence measurement.

Entry	1	2	3	4	5	6	7	8	9
SDS (mL)	4	5	6	6.5	7	7.5	8	9	10
SDS (mM)	4	5	6	6.5	7	7.5	8	9	10
SDBS (mL)	0.8	1.2	2	2.4	2.6	2.8	3.2	3.6	4
SDBS (mM)	0.36	0.54	0.9	1.08	1.17	1.26	1.44	1.62	1.8
F127 (mL)	0.05	0.1	0.2	0.5	1	1.5	2	4	8
F127 (mg/mL)	0.05	0.1	0.2	0.5	1	1.5	2	4	8
Pyrene (mL)	1	1	1	1	1	1	1	1	1
Pyrene (µM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Table S2 Preparation of different concentrations of surfactant solutions











Fig. S3 Cell viability of HeLa cells versus the concentrations of EDS. Incubating time: 24 hours. Data are shown as mean  $\pm$  s.d., with n = 3.



Fig. S4 (a) Fluorescence response of EDS with different concentrations (from 15 to 35  $\mu$ M) to [SDS] = 7 mM;  $\lambda_{ex}$  = 415 nm. (b) Plot of the maximum on fluorescence curve *vs.* [EDS].



Fig. S5 TEM images of the entities obtained in 25  $\mu$ M EDS aqueous solution containing (a) 4 mM and (b) 9 mM SDS, respectively



**Fig. S6** Fluorescence response of pyrene (0.6  $\mu$ M) to the concentrations of SDBS (left) and plot of the  $I_{373}/I_{384}$  value vs. [SDBS] (right).  $I_{373}$  and  $I_{384}$  are the fluorescence intensities of the peaks at 372 and 383 nm, respectively;  $\lambda_{ex} = 334$  nm.



Fig. S7 Fluorescence response of pyrene (0.6  $\mu$ M) to the concentrations of F127 (left) and plot of the  $I_{373}/I_{384}$  value vs. [F127] (right).  $I_{373}$  and  $I_{384}$  are the fluorescence intensities of the peaks at 372 and 383 nm, respectively;  $\lambda_{ex} = 334$  nm.

Table S3 CMC values of SDS, SDBS and F127 measured

	CMC	
	EDS	Pyrene
SDS	7.00 mM	6.78 mM
SDBS	1.35 mM	1.30 mM
F127	1.31 mg/mL	1.71 mg/mL



**Fig. S8** Fluorescence response of EDS to the concentrations of cationic surfactants 1231 and CTAB. (a) and (c) Fluorescence response of EDS (25  $\mu$ M) to the concentrations of 1231 and CTAB, respectively (1231: from 14 to 19 mM and CTAB: from 0.2 to 1.6 mM);  $\lambda_{ex}$ =415 nm. (b) and (d) Plot of the maximum on fluorescence curves *vs.* [1231]/[CTAB].



Fig. S9 Dynamic light scattering results for (a-d) SDS (4 and 9 mM), SDBS (0.4 and 1.6 mM), F127 (0.05 and 8 mg/mL) and AEO-3 (0.25 and 2.5 mM) samples including EDS (25  $\mu$ M)) in aqueous solutions.