Electronic Supplementary Material (ESI) for Green Chemistry
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Supporting Information for:

Surfactant-Assisted Algal Flocculation via Aggregation-Induced Emission with Ultralow Critical Micelle Concentration

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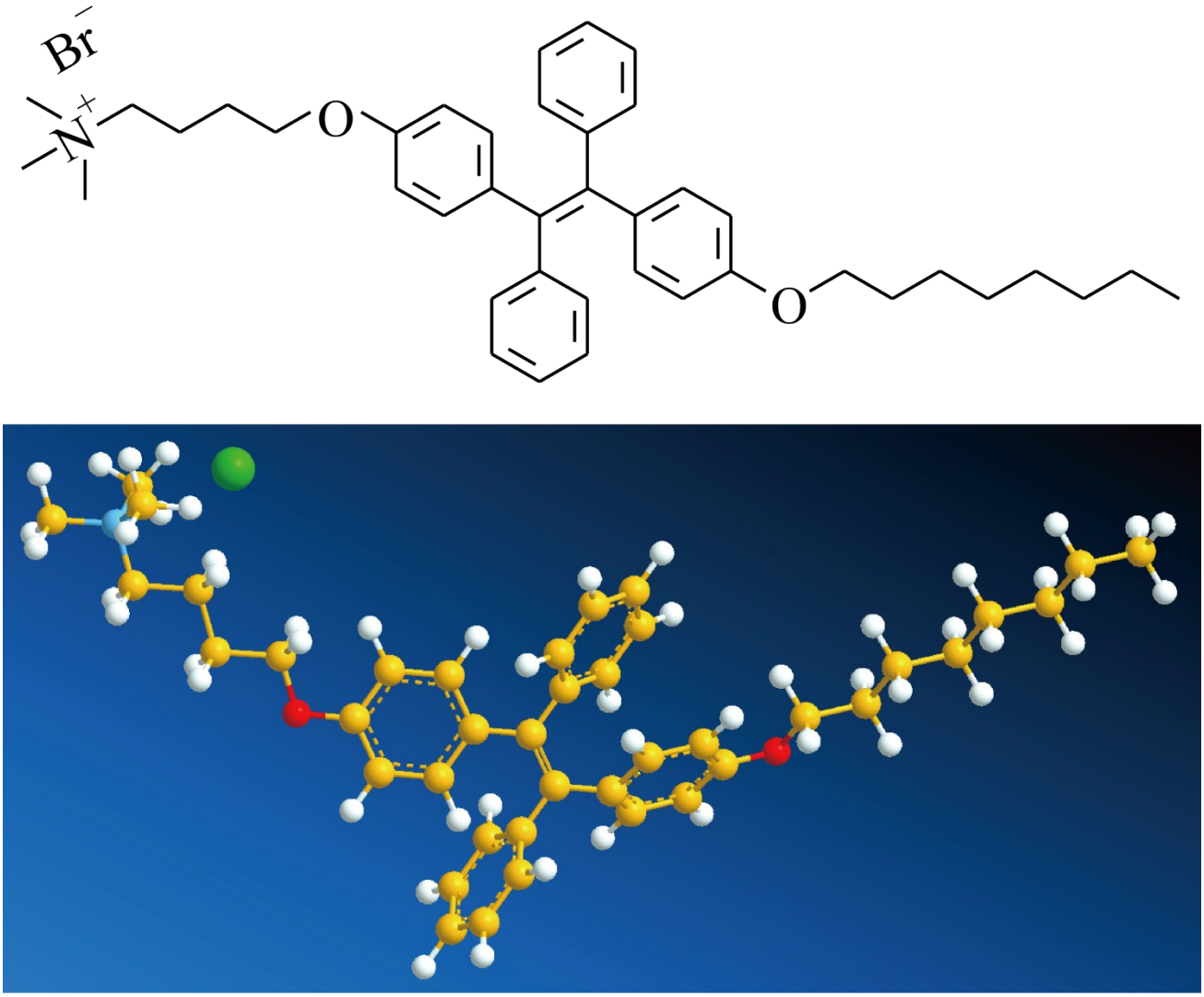

Fig. S1 Chemical structure and ball-and-stick model of TPE-DTAB. In the 3D model, yellow, white, blue, red and green balls represent the elements of carbon, hydrogen, nitrogen, oxygen and bromine.

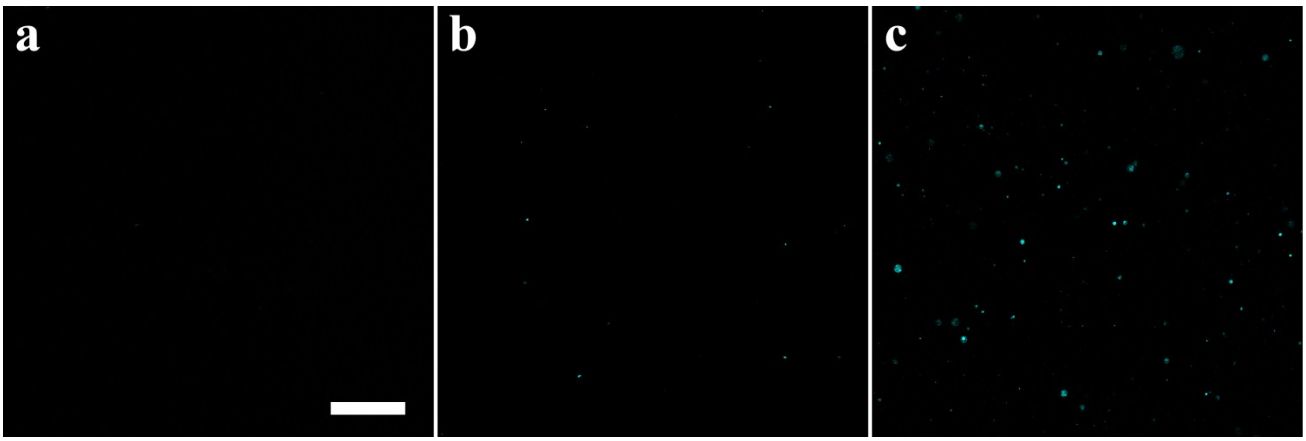

Fig. S2 2D fluorescence images of TPE-DTAB solution at different concentrations, (a) 20 μM, (b) 40 μM, (c) 80 μM, scale bar: 20 μm.

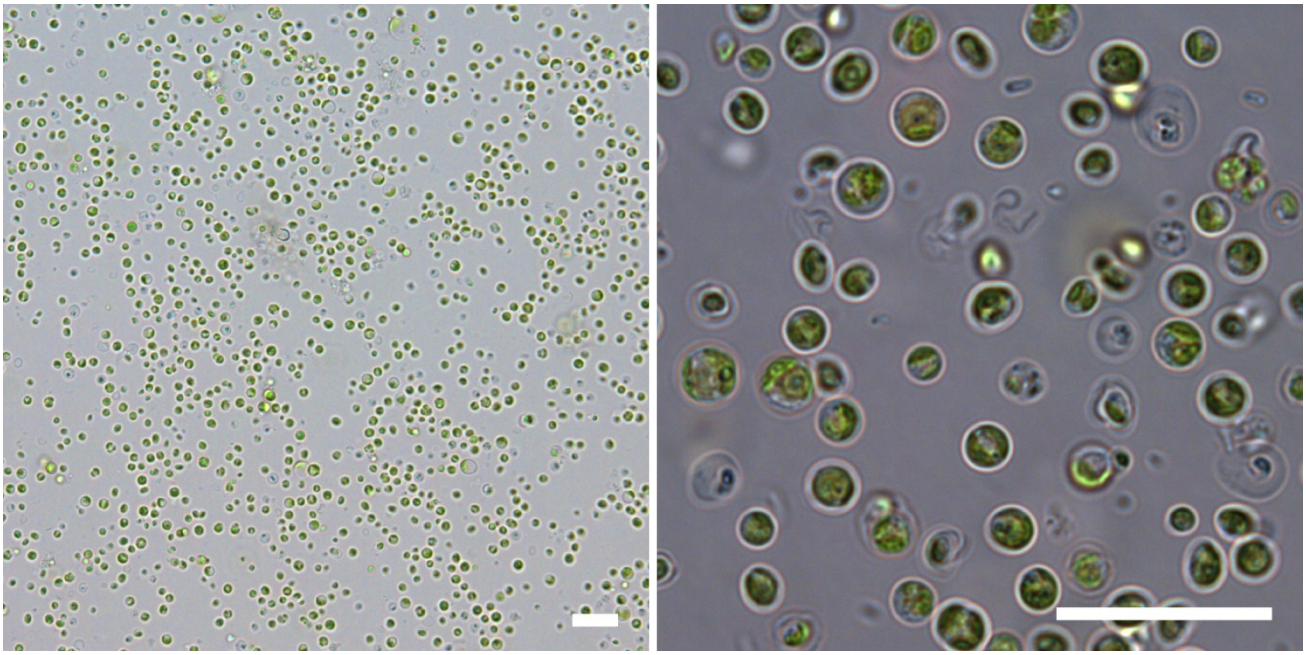

Fig. S3 Widefield images of algal cells dispersed homogeneously in aqueous media, scale bar: 20 μm.

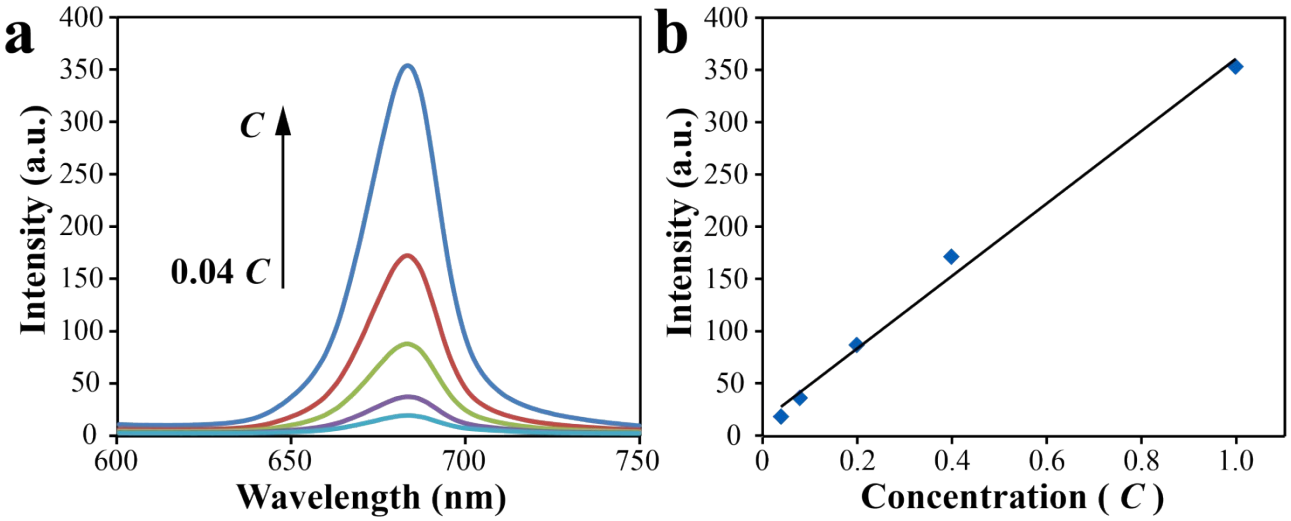

Fig. S4 (a) Fluorescence spectra of chlorophyll in algal cells (excitation wavelength: 488 nm, PMT voltage: 700V, slit width: 10 nm). *C* represents the concentration of control sample (2.9×10^{10} cells/L) and it was diluted to different concentrations (from bottom to top: 0.04*C*, 0.08*C*, 0.2*C*, 0.4*C* and *C*). (b) Plot of fluorescence intensity at 683 nm vesus the corresponding algal concentration.

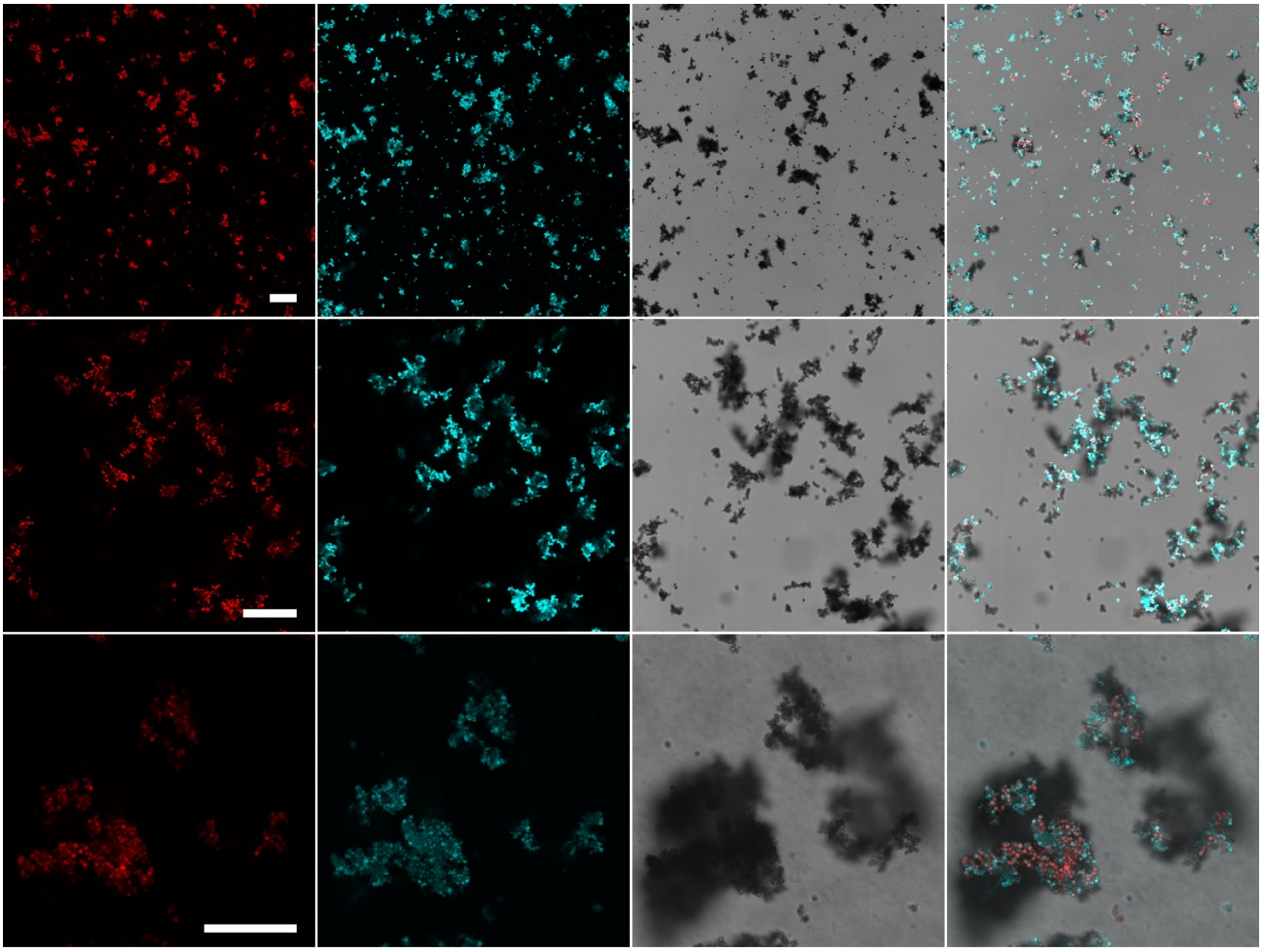

Fig. S5 2D fluorescence images of algae interacted with 80 μM TPE-DTAB after 2 h. Cyan channel represents the fluorescence of TPE-DTAB (excitation laser diode: 405 nm). Red channel represents the fluorescence of chlorophyll (excitation laser diode: 488 nm). Overlay channel is the combination of cyan channel, red channel and bright field channel (only for 2D model), scale bar: 100 μm. Objective lenses used in (A), (B) and (C) are 10, 20 and 40.

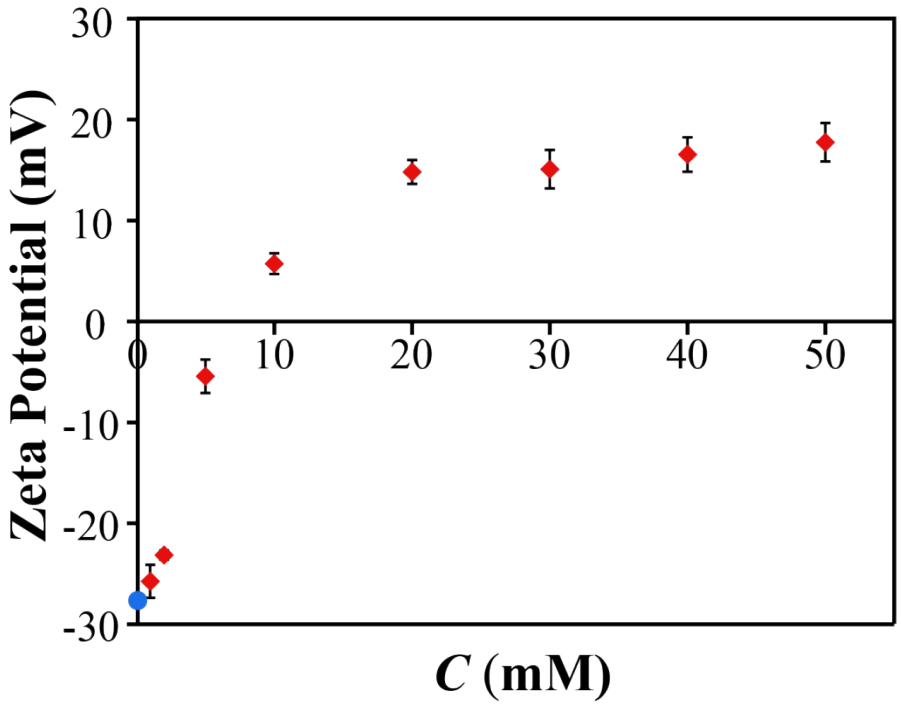

Fig. S6 Zeta potentials of algae interacted with different concentrations of DTAB after 10 minutes (red cubes), blue dot: algae without DTAB.

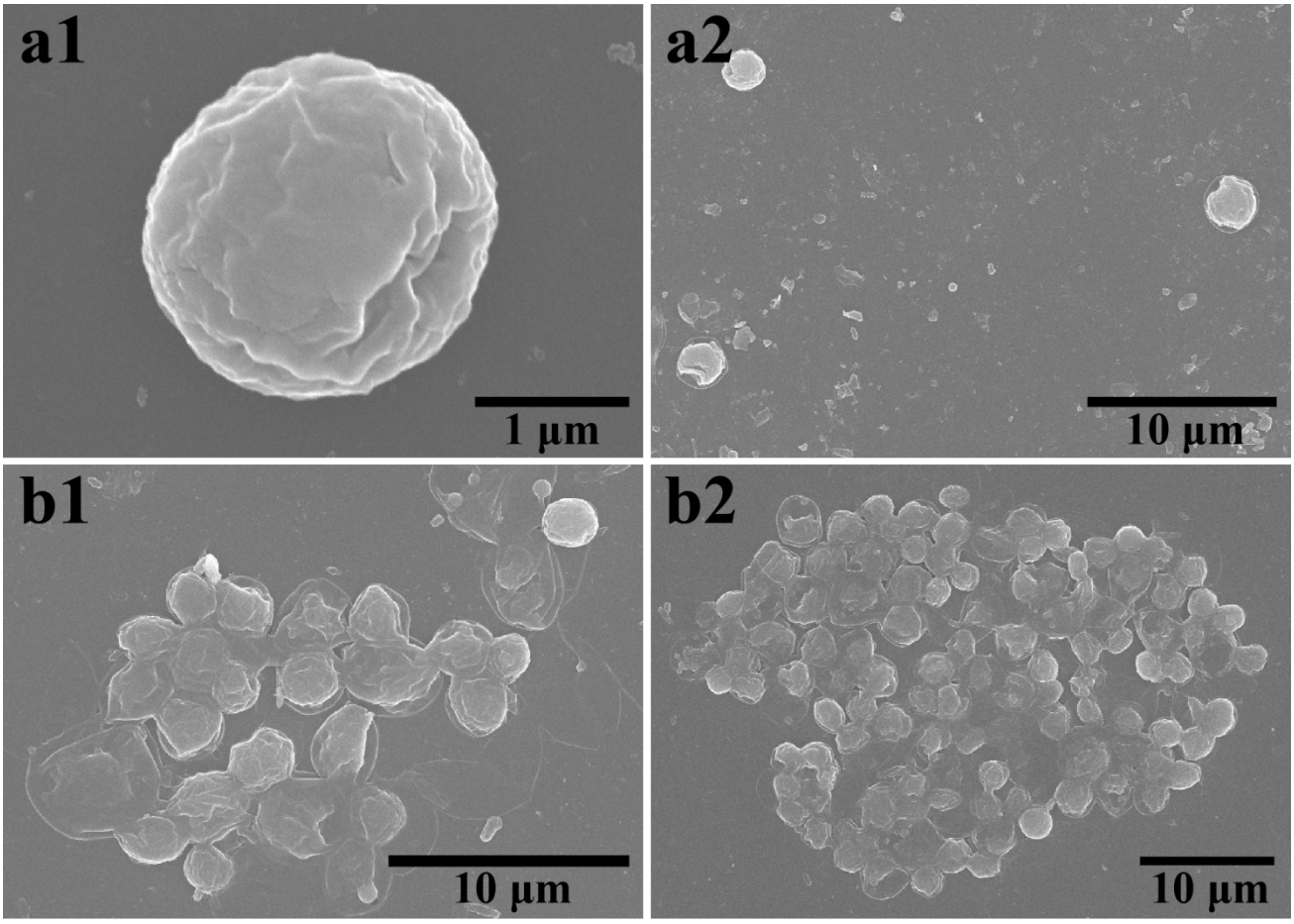

Fig. S7 SEM images of algal cells interacted with (a) 1.0 mM and (b) 20 mM DTAB after 2 h. Magnification factors of (a1), (a2), (b1) and (b2) are 18000, 3500, 4500 and 2500, respectively.

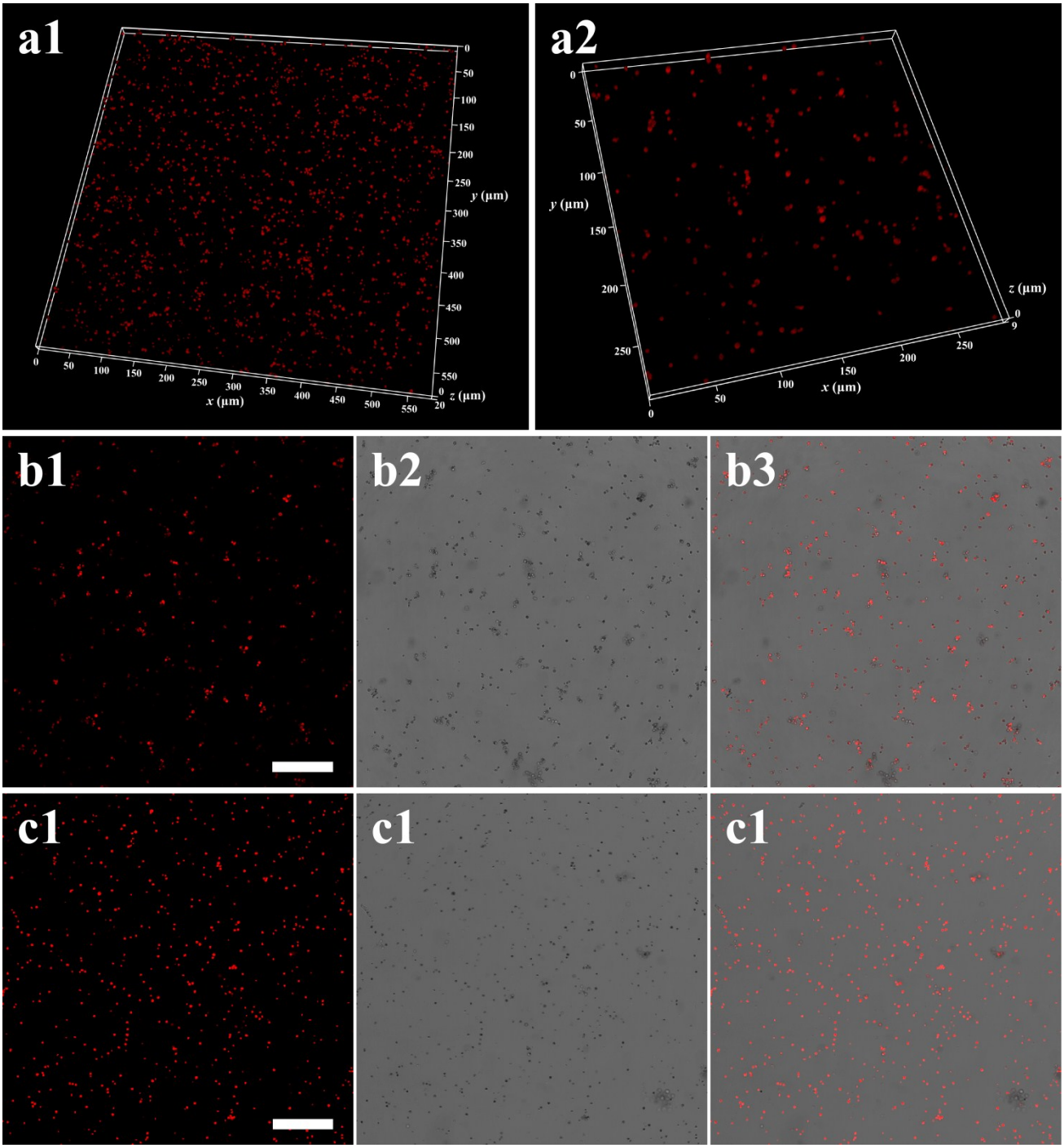

Fig. S8 (a) 3D reconstruction images of algae interacted with 200 μM STAB after 2 h. (b, c) 2D fluorescence images of algae interacted with 200 μM STAB after 2 h, scale bar: 100 μm.

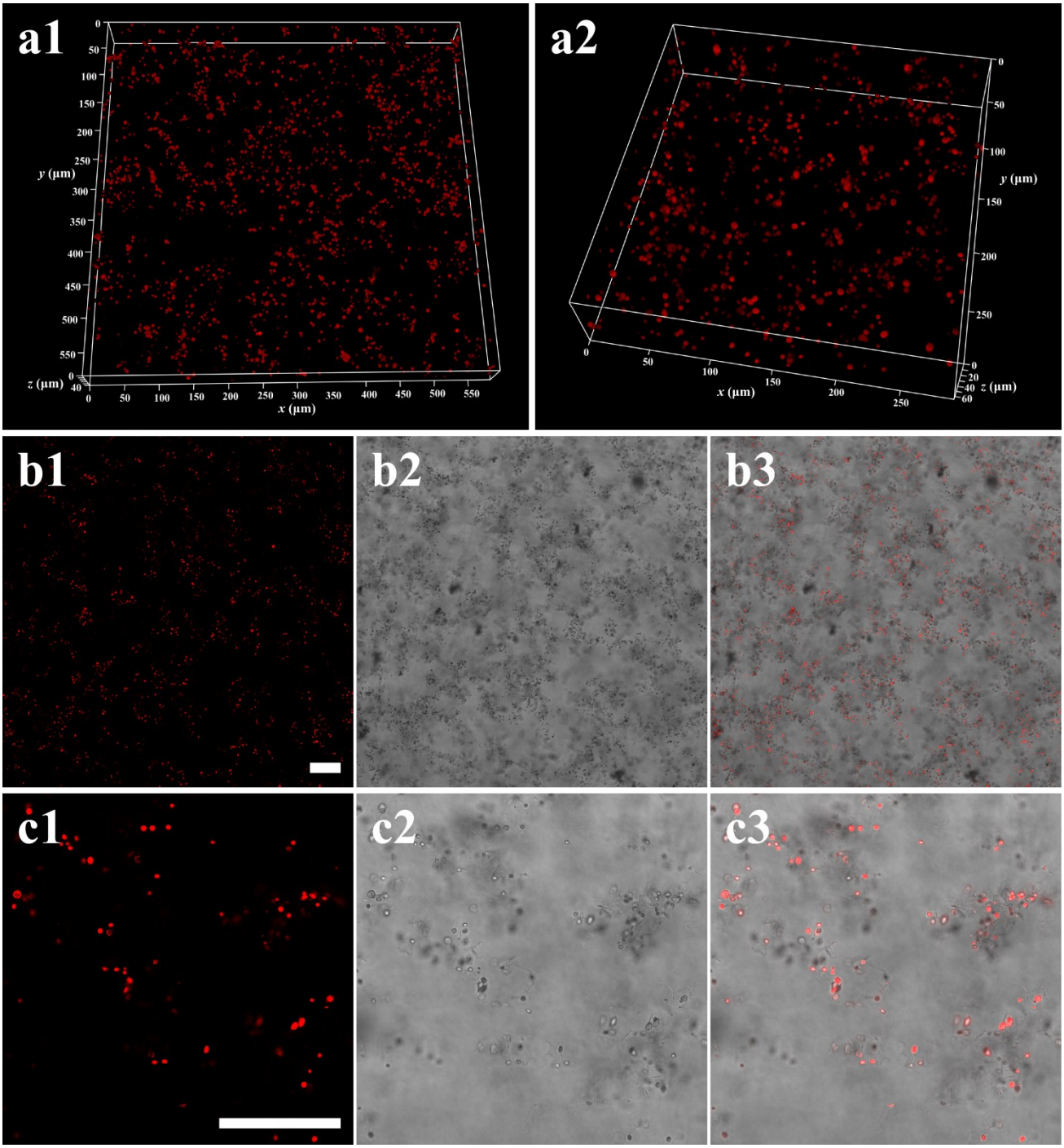

Fig. S9 (a) 3D reconstruction images of algae interacted with 600 μM STAB after 2 h. (b, c) 2D fluorescence images of algae interacted with 600 μM STAB after 2 h, scale bar: 100 μm.

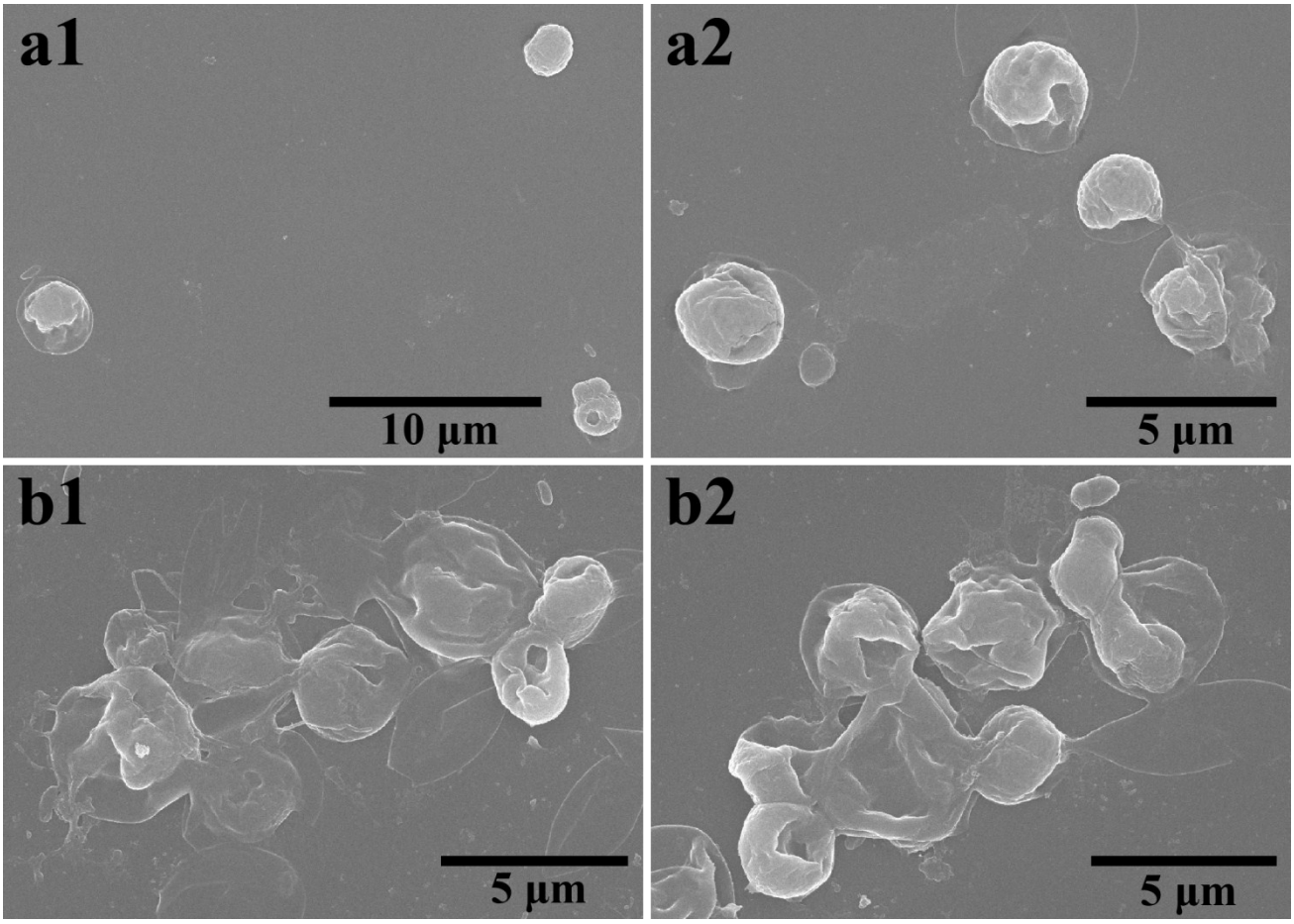

Fig. S10 SEM images of algal cells interacted with (a) 200 µM and (b) 600 µM STAB after 2 h. Magnification factors of (a1), (a2), (b1) and (b2) are 4000, 7000, 7000 and 7000, respectively.

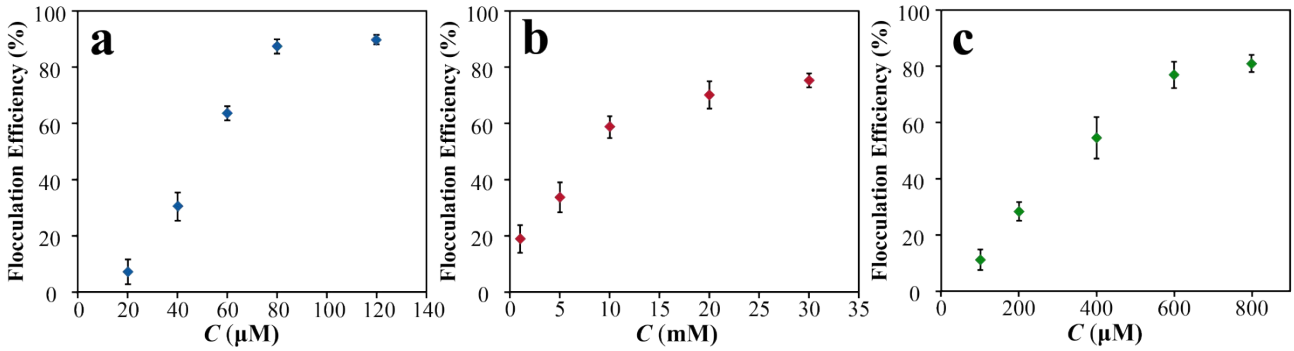

Fig. S11 Efficiencies of surfactant-assisted algal flocculation: (a) TPE-DTAB (20 μM, 40 μM, 60 μM, 80 μM and 120 μM), (b) DTAB (1.0 mM, 5 mM, 10 mM, 20 mM and 30 mM), (c) STAB (100 μM, 200 μM, 400 μM, 600 μM and 800 μM). Flocculation duration of 2 hours was applied to all samples with algal cell density of 5×10^9 cells/L.