

Supporting Information

**Cephalopod Chromatophores Contain Photosensitizing Nanostructures that  
may Facilitate with Light Sensing and Signaling in the Skin**

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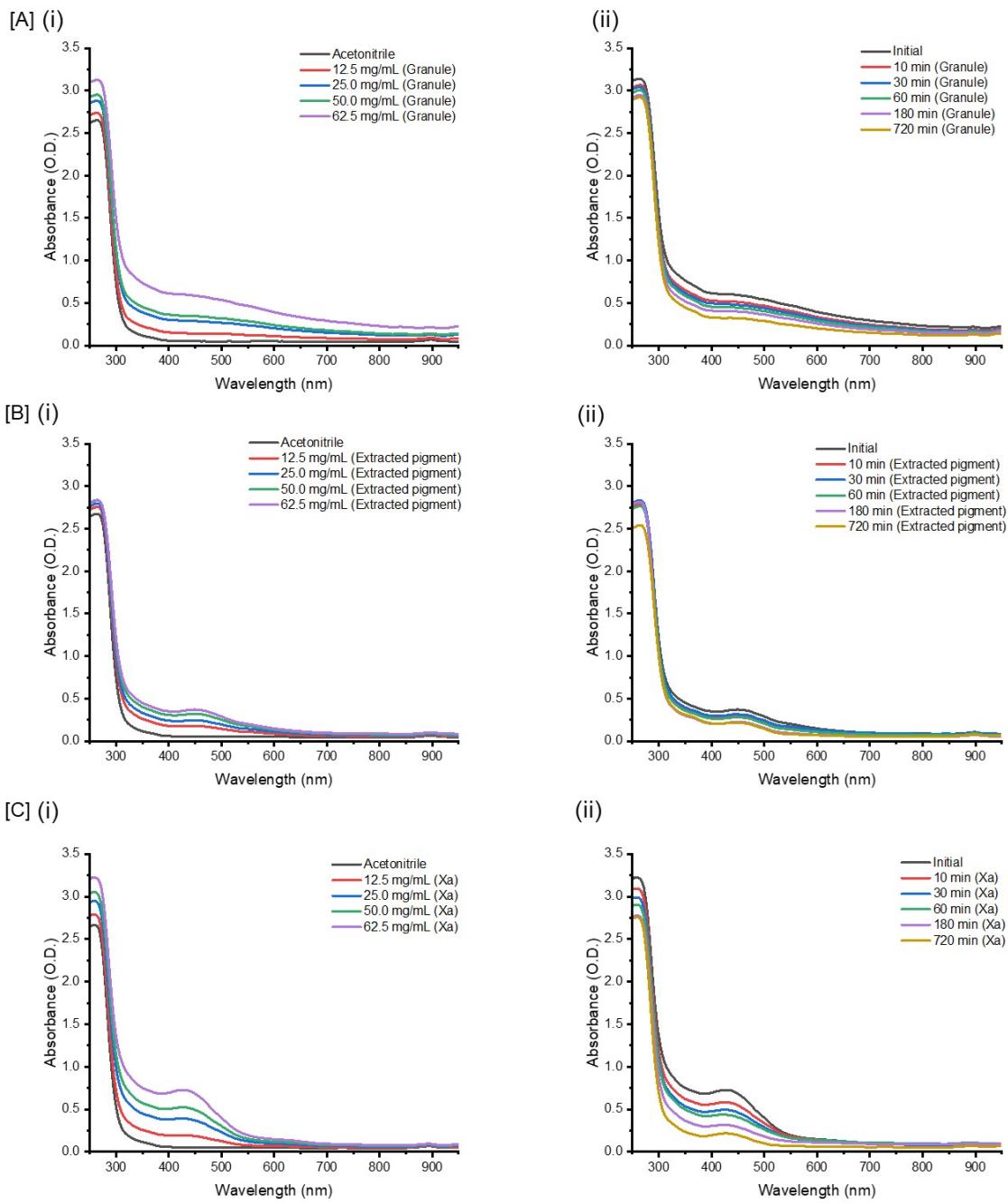


Figure S1. Comparison of the UV-vis absorbance spectra of dye solutions containing (A) granules, (b) extracted pigments from the granules, and (c) synthetic Xa, both (i) at different concentrations before dye loading and (ii) measuring the absorbance over time at 62.5 mg/mL.

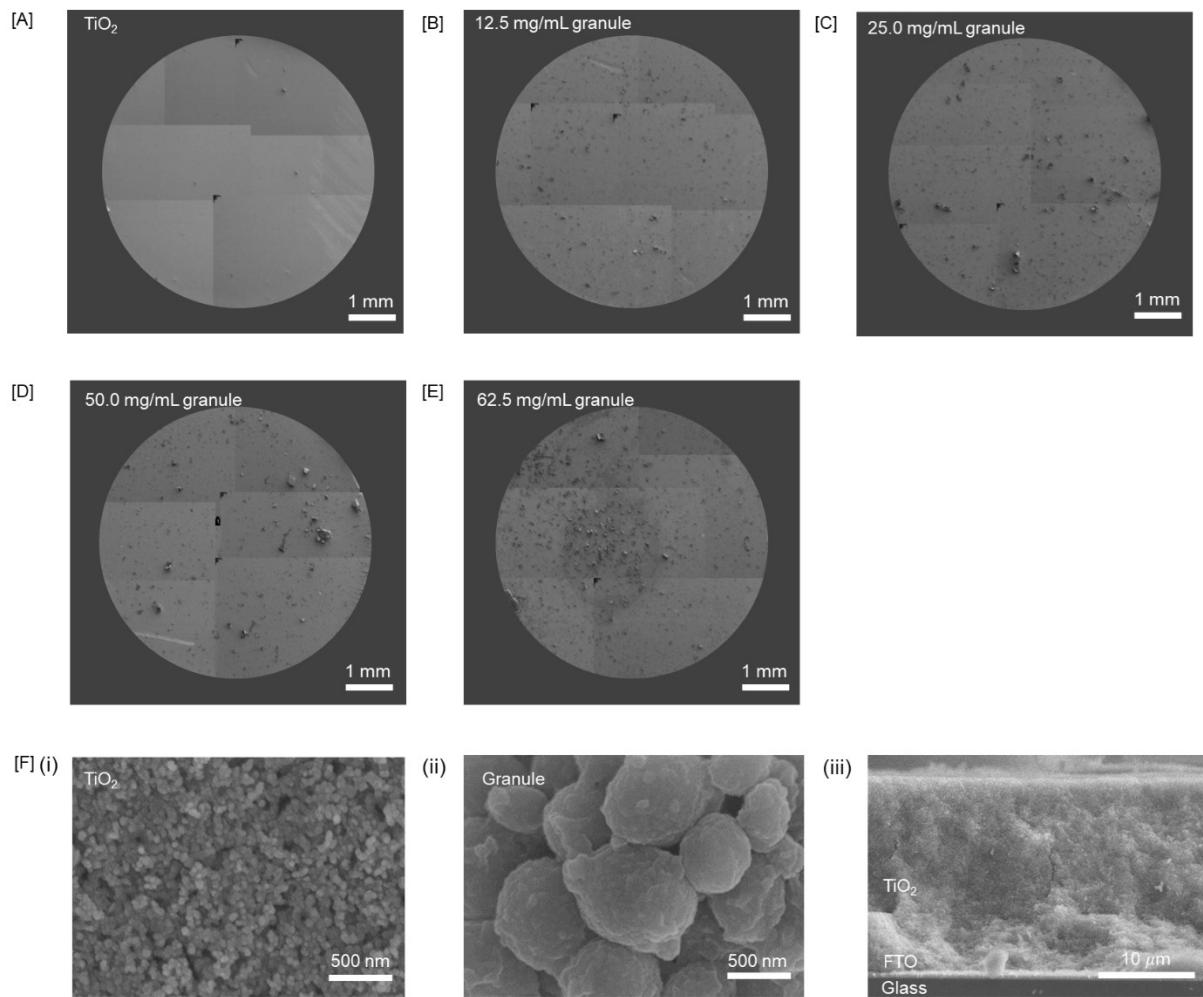


Figure S2. Scanning electron microscopy images of the (A)  $\text{TiO}_2$  photoanode, (B) 12 mg  $\text{mL}^{-1}$  granule loaded onto the  $\text{TiO}_2$  photoanode, (C) 25.0 mg  $\text{mL}^{-1}$  granule loaded onto the  $\text{TiO}_2$  photoanode, (D) 50 mg  $\text{mL}^{-1}$  granule loaded onto the  $\text{TiO}_2$  photoanode, and (E) 62.5 mg  $\text{mL}^{-1}$  granule loaded onto the  $\text{TiO}_2$  photoanode. (F) High magnification images of (i)  $\text{TiO}_2$  and (ii) granules found on the  $\text{TiO}_2$  photoanode. (iii) Cross-section image of  $\text{TiO}_2$  doctor bladed on FTO coated glass.

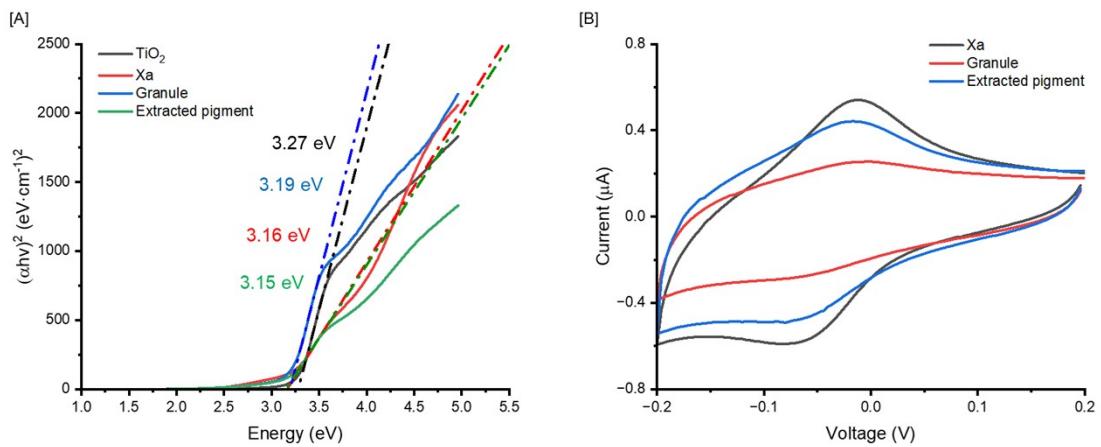


Figure S3. (A) The calculated direct energy bandgap from Tauc plot. (B) Cyclic voltammograms (CV) of granule, extracted pigment, and synthetic Xa in 0.1 mol L<sup>-1</sup> PBS buffer with potential window of -0.2 to 0.2 V with 50 mV s<sup>-1</sup> scanning speed.

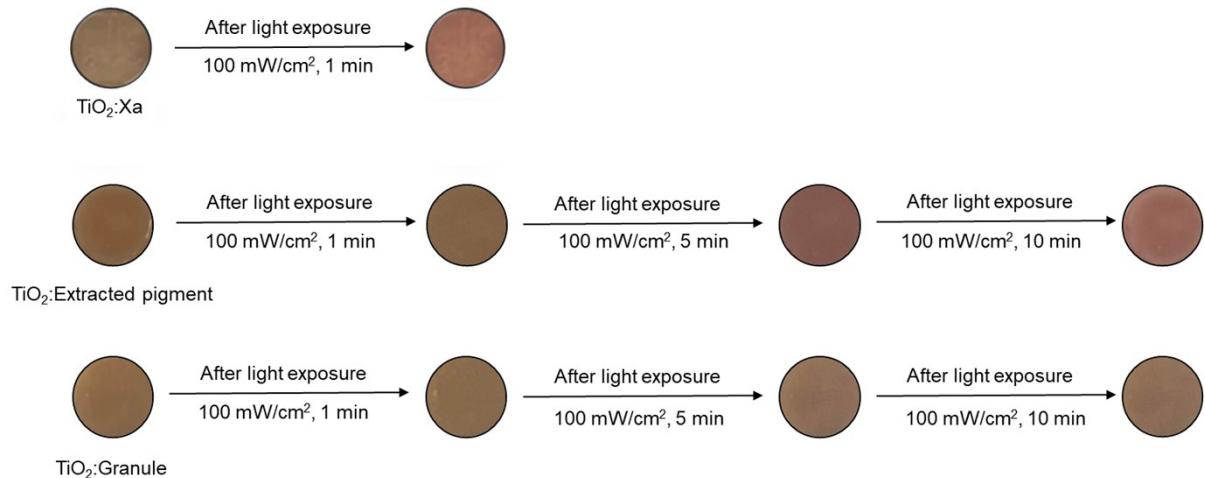


Figure S4. After exposing  $\text{TiO}_2$  films loaded with a maximum concentration of  $62.5 \text{ mg mL}^{-1}$  of granules, extracted pigment, and synthetic Xa to light at an intensity of  $100 \text{ mW cm}^{-2}$ , distinct color changes were observed. The film loaded with synthetic Xa transitioned from brown (or yellow) to red within 1 min (top), while the extracted pigment induced a color change after 10 min (middle). Notably, no observable color change occurred in the film loaded with granules over 10 min (bottom).

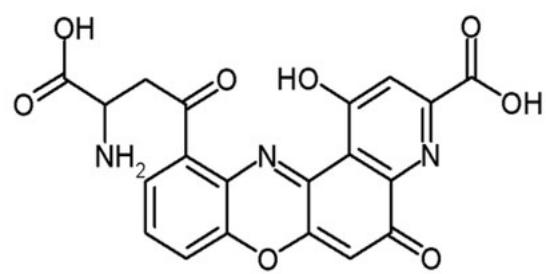


Figure S5. Chemical structure of xanthommatin (Xa)