

Supplementary Material (SM) for

## Sonochemical functionalization of MoS<sub>2</sub> by Zinc Phthalocyanine and its visible light induced photocatalytic activity

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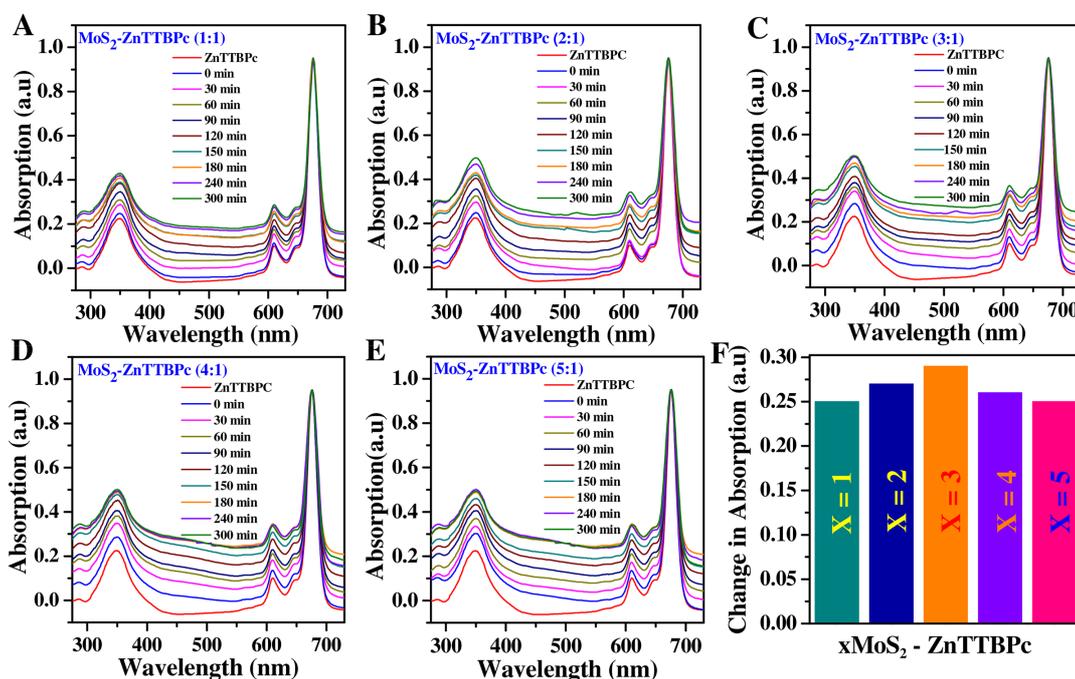


Figure S1 Optical absorption spectra of MoS<sub>2</sub>-ZnTTBPc composite with varying ratio of MoS<sub>2</sub> and ZnTTBPc (A) 1:1, (B) 2:1, (C) 3:1, (D) 4:1, (E) 5: 1. (F) A comparison of change in absorption after 300 min of sonication for the varying ratio of MoS<sub>2</sub> in the MoS<sub>2</sub>-ZnTTBPc composite.

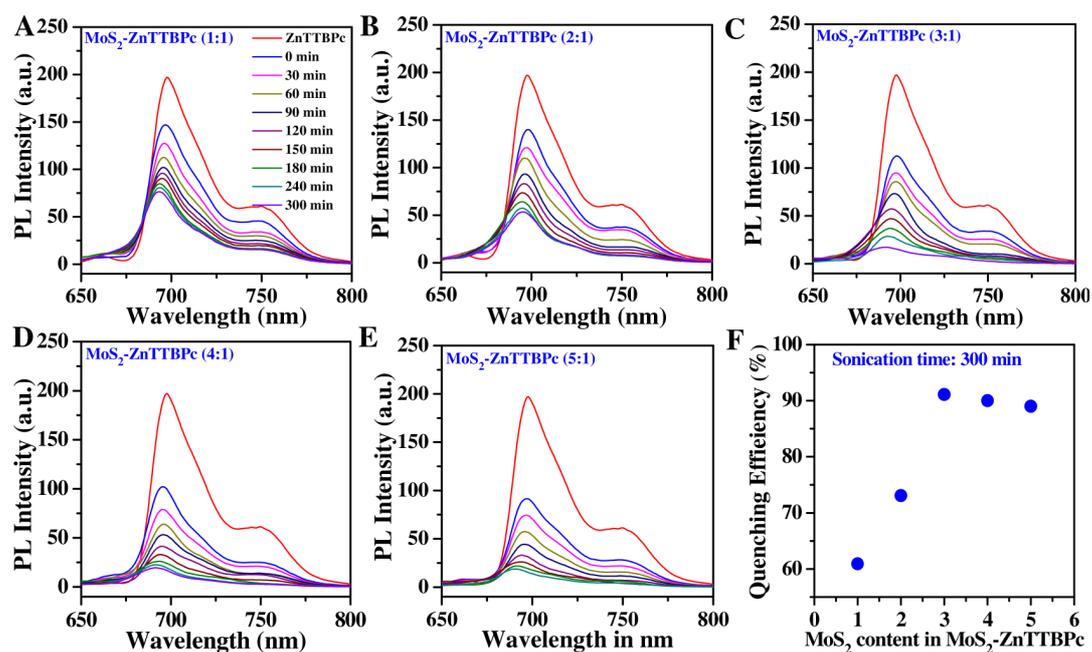


Figure S2 Photoluminescence spectra of controlled-ZnTTBPc, and MoS<sub>2</sub>-ZnTTBPc composite with varying ratio of MoS<sub>2</sub> and ZnTTBPc (A) 1:1, (B) 2:1, (C) 3:1, (D) 4:1, (E) 5: 1. (F) Variation of quenching efficiency of the MoS<sub>2</sub>-ZnTTBPc composite for different MoS<sub>2</sub> content in the composite after 300 min of sonication.

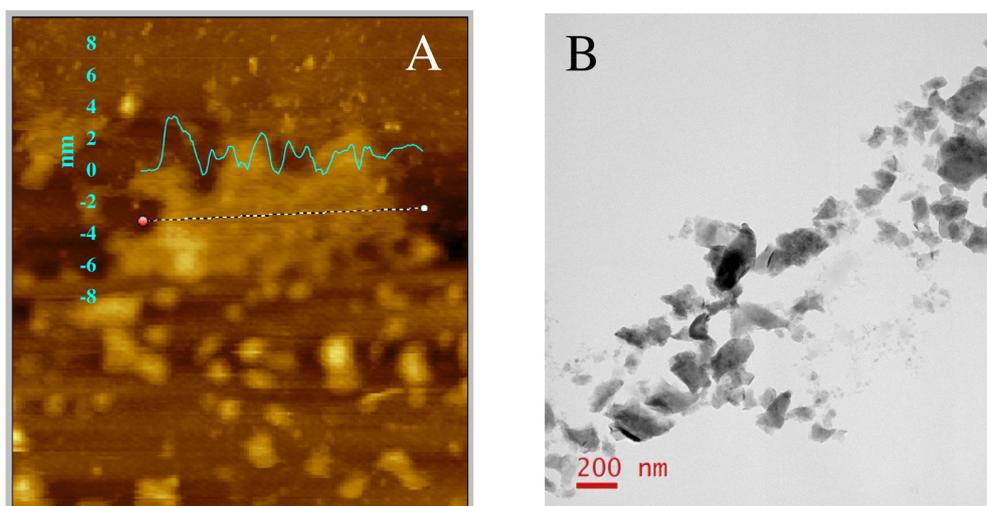


Figure S3 (A) AFM image of MoS<sub>2</sub>-ZnTTBPc (3:1) composite films on a silicon wafer. (B) TEM image of MoS<sub>2</sub>-ZnTTBPc (3:1) composite.

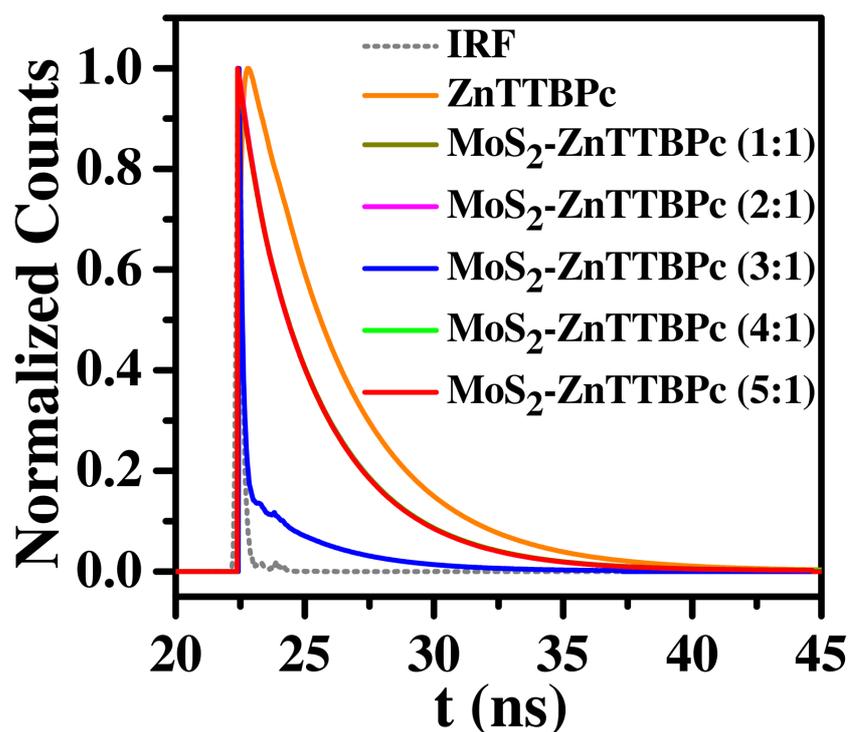


Figure S4 Lifetime transients of controlled-ZnTTBPc, MoS<sub>2</sub>-ZnTTBPc (1:1), MoS<sub>2</sub>-ZnTTBPc (2:1), MoS<sub>2</sub>-ZnTTBPc (3:1), MoS<sub>2</sub>-ZnTTBPc (4:1), MoS<sub>2</sub>-ZnTTBPc (5:1) composites along with the IRF.

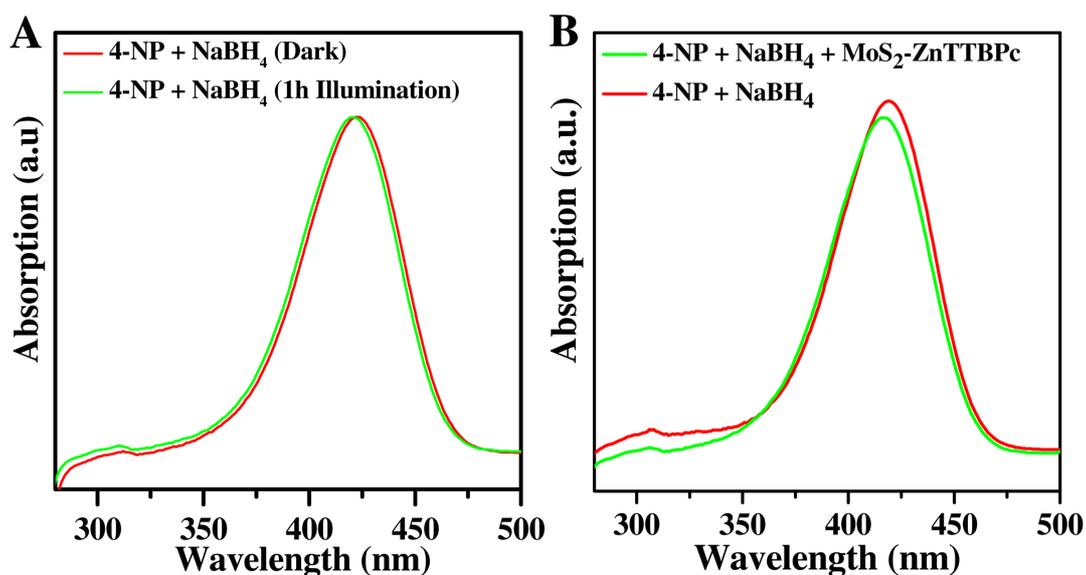


Figure S5 UV-vis absorption spectra of 4-NP and NaBH<sub>4</sub> solution (A) without catalyst under dark and simulated solar light illumination for 1 h (B) with and without MoS<sub>2</sub>-ZnTTBPc (3:1) composite under dark.

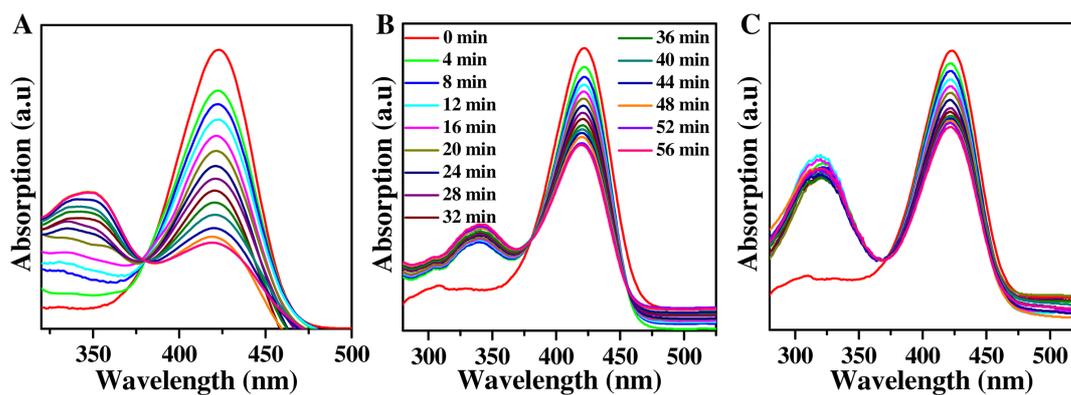


Figure S6 UV-vis absorption spectra of 4-NP and NaBH<sub>4</sub> solution with (A) MoS<sub>2</sub>-ZnTTBPc (3:1) composite, (B) controlled-ZnTTBPc, and (C) controlled-MoS<sub>2</sub> for different time of simulated solar light illumination.

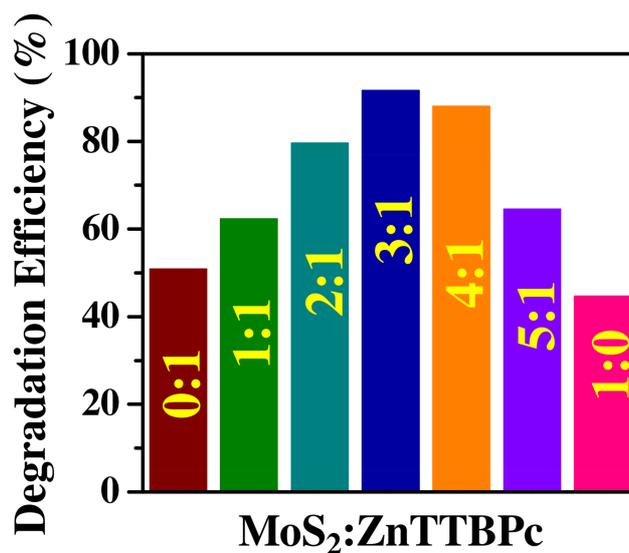


Figure S7 Comparison of the photo degradation efficiency with varying ratio of MoS<sub>2</sub> and ZnTTBPc in the MoS<sub>2</sub>-ZnTTBPc composite.

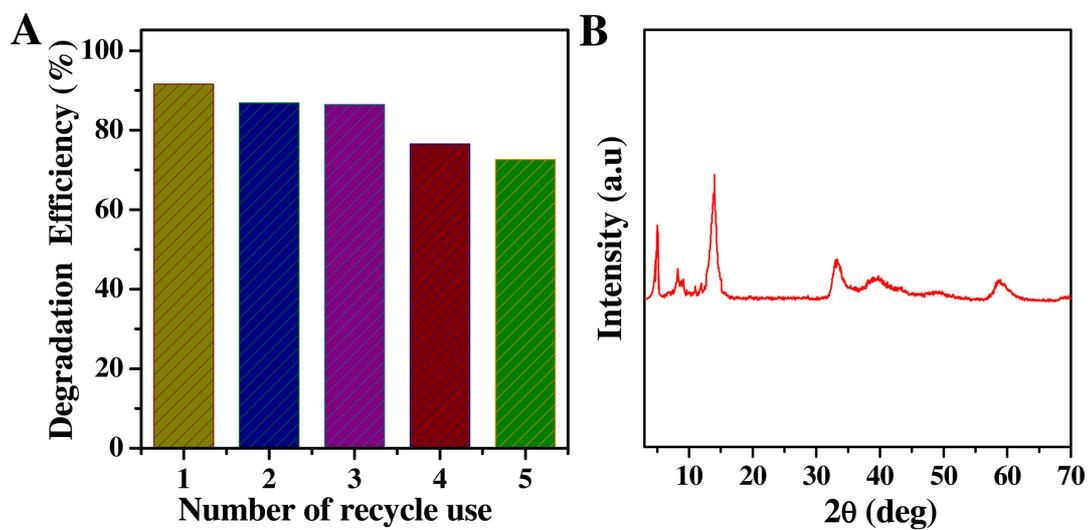


Figure S8 (A) Photodegradation efficiency of MoS<sub>2</sub>-ZnTTBPc (3:1) composite for different cycle. (B) The XRD pattern of MoS<sub>2</sub>-ZnTTBPc (3:1) composite after five cycles of reduction of 4-NP.