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Tracing slow photon effect in ZnO inverse opal film for photocatalytic activity enhancement

Jing Liu,[a] Jun Jin,[a] Yu Li,[*a] Hua-Wen Huang,[a] Chao Wang,[a]

Min Wu,[*a] Li-Hua Chen[a] and Bao-Lian Su[*a,b]

[a]*Laboratory of Living Materials at State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, 122 Luoshi Road, 430070 Wuhan, Hubei, China*

[b]*Laboratory of Inorganic Materials Chemistry (CMI), University of Namur, 61 rue de Bruxelles, B-5000 Namur, Belgium*

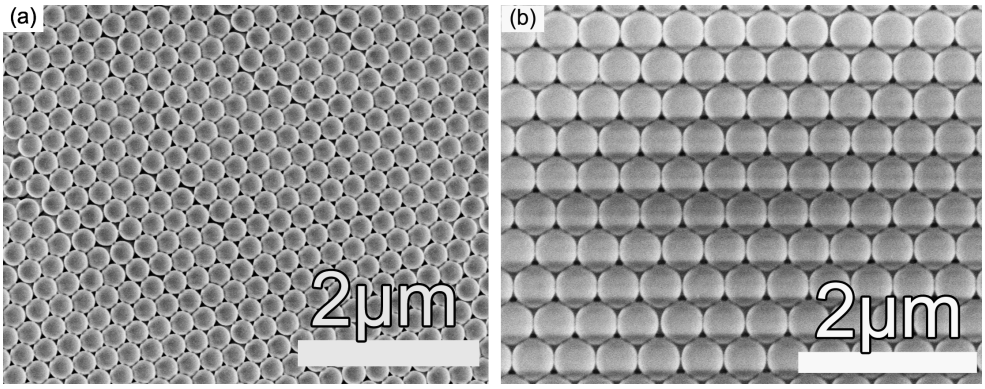

Figure S1. SEM images of the as-synthesized P(St-MMA-SPMAP) colloid spheres with different sizes: (a) 260 nm, (b) 470 nm, showing the uniform and well-ordered in a large scale of hexagonally packed layers of (111) face of the colloidal templates.

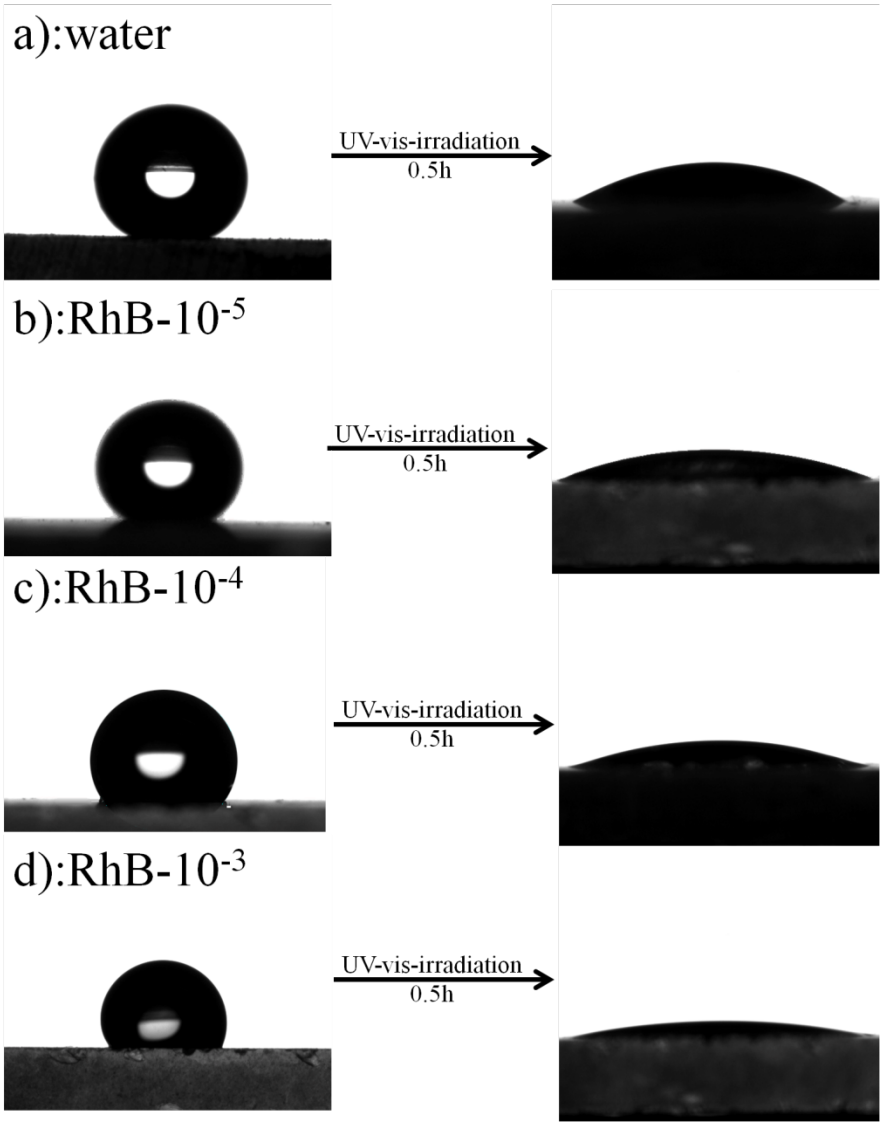

Figure S2. Photographs of water and different concentrations of RhB aqueous solution droplet shapes on ZnO-IO-260 film before (left) and after (right) UV-vis irradiation for 0.5h. Upon UV-vis irradiation, the water droplet can spread out on the ZnO-IO-260 film showing the wettability changes from superhydrophobicity to hydrophilicity. Similar phenomenon is also observed when changing the concentrations of RhB aqueous solution. Particularly, when changing the concentration of RhB aqueous solution, the gradually decreased contact angles indicates that RhB molecules can tight adsorb on the surface of ZnO-IO film, which is beneficial for photodegradation of RhB molecules on ZnO-IO film.

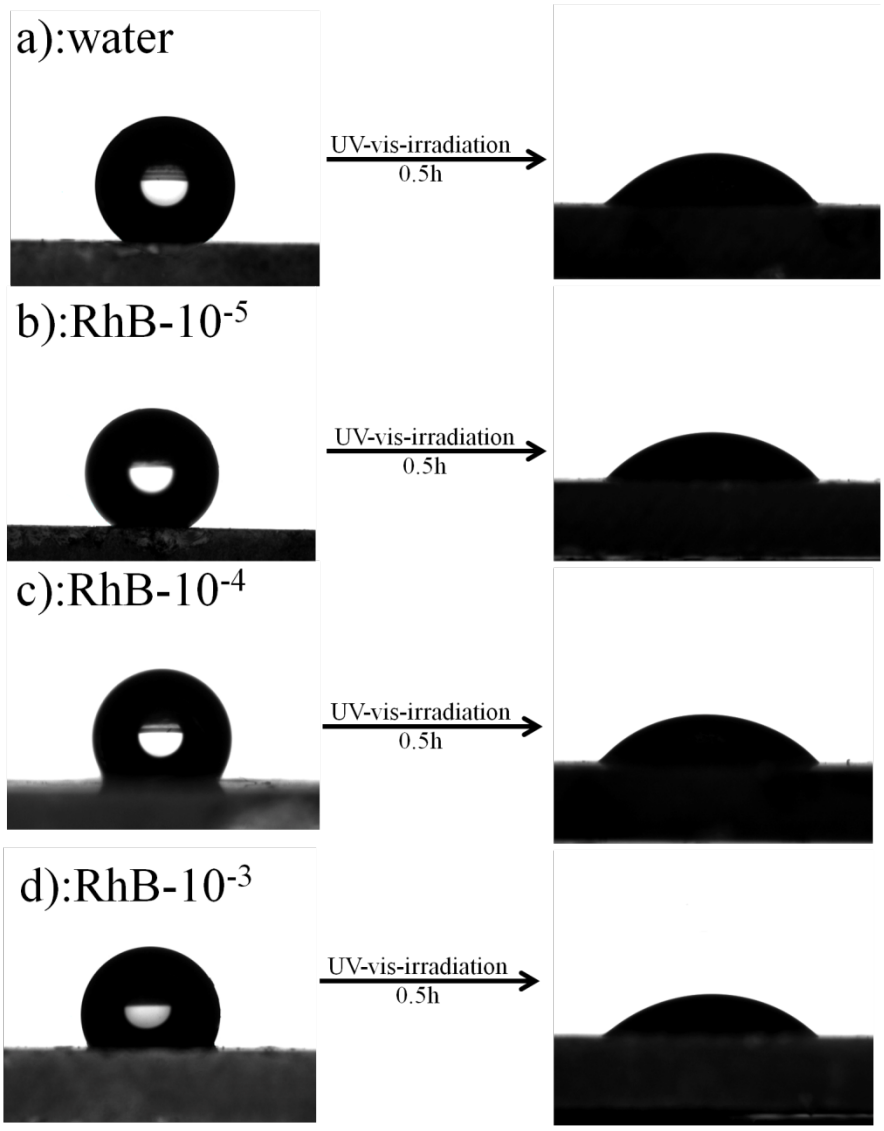

Figure S3. Photographs of water and different concentrations of RhB aqueous solution droplet shapes on ZnO-IO-470 film before (left) and after (right) UV-vis irradiation for 0.5h. Upon UV-vis irradiation, the water droplet can spread out on the ZnO-IO-470 film showing the wettability changes from superhydrophobicity to hydrophilicity. Similar phenomenon is also observed when changing the concentrations of RhB aqueous solution. Particularly, when changing the concentration of RhB aqueous solution, the gradually decreased contact angles indicates that RhB molecules can tight adsorb on the surface of ZnO-IO film, which is beneficial for photodegradation of RhB molecules on ZnO-IO film.

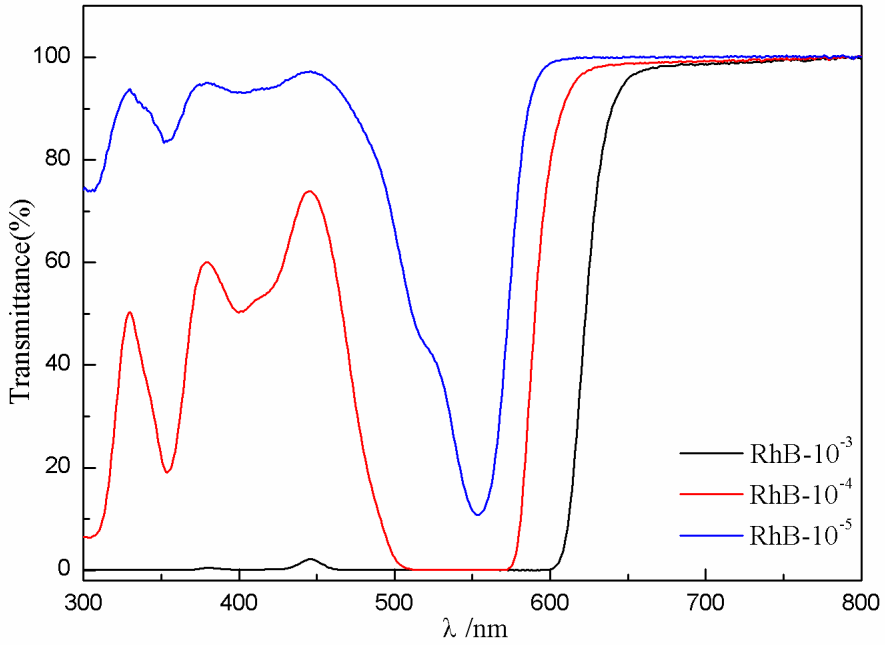

Figure S4. Transmittance spectra of different concentrations of RhB aqueous solution. It demonstrated that RhB with the concentration of 1.0×10^{-5} mol/L has a good transmittance. With the concentration increasing, the transmittance of the RhB aqueous solution deceased sharply due to the high absorption, refraction and scattering. This can influence the solar utilization seriously. Considering the contact angles of ZnO-IO films in different concentrations of RhB aqueous solution are very close and the transmittance of different concentrations of RhB aqueous solution, RhB with the concentration of 1.0×10^{-5} mol/L was then chosen to test the photodegradation ability of the ZnO-IO film.