

Supporting Information Available

Synthesis of the $\text{Bi}_2\text{S}_3\text{-Bi}_2\text{O}_3$ Composites and Their Enhanced Photosensitive Property

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Synthesis of pure Bi_2S_3 product: In the typical experiment, 0.3 g of surfactant PVP and 0.75 g $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ were first dissolved in 30 ml of distilled water, and then 0.24 g of $\text{Na}_2\text{S} \cdot 9\text{H}_2\text{O}$ was added slowly to the solution. The solution was stirred about 10 min. Then the whole mixture was transferred into a 50 ml Teflon-lined autoclave, sealed and heated at 150 °C for 24 h. The final precipitates were collected and washed with deionized water and pure ethanol several times and dried in the air at 80 °C.

Synthesis of pure Bi_2O_3 product: In the typical experiment, 0.3 g of surfactant PVP and 0.75 g $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ were first dissolved in 30 ml of distilled water, and then filled a certain amount of $\text{NH}_3 \cdot \text{H}_2\text{O}$ to adjust the pH value to 11. Afterward, the whole mixture was transferred into a 50 ml Teflon-lined autoclave, sealed and heated at 150 °C for 24 h. The final precipitates were collected and washed with deionized water and pure ethanol several times and dried in the air at 80 °C.

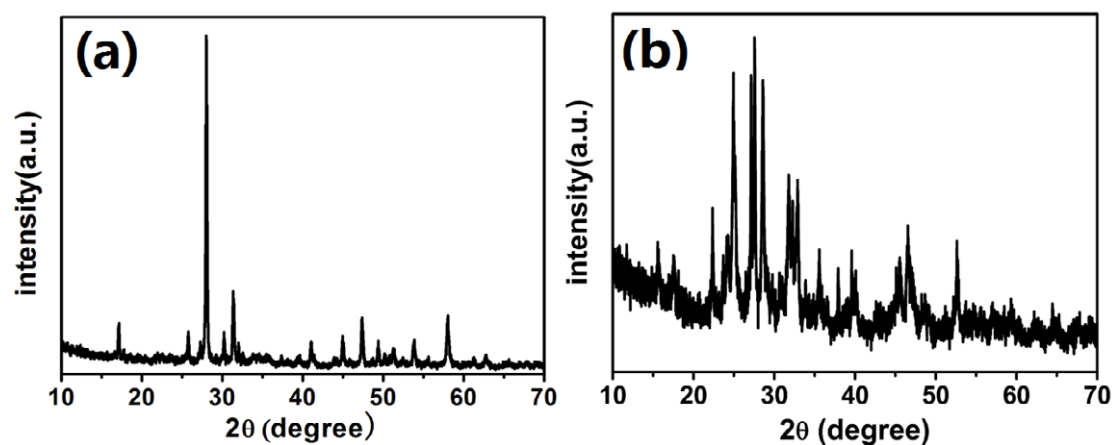


Figure S1. XRD patterns of the as-obtained samples: (a) pure Bi_2O_3 and (b) pure Bi_2S_3 .

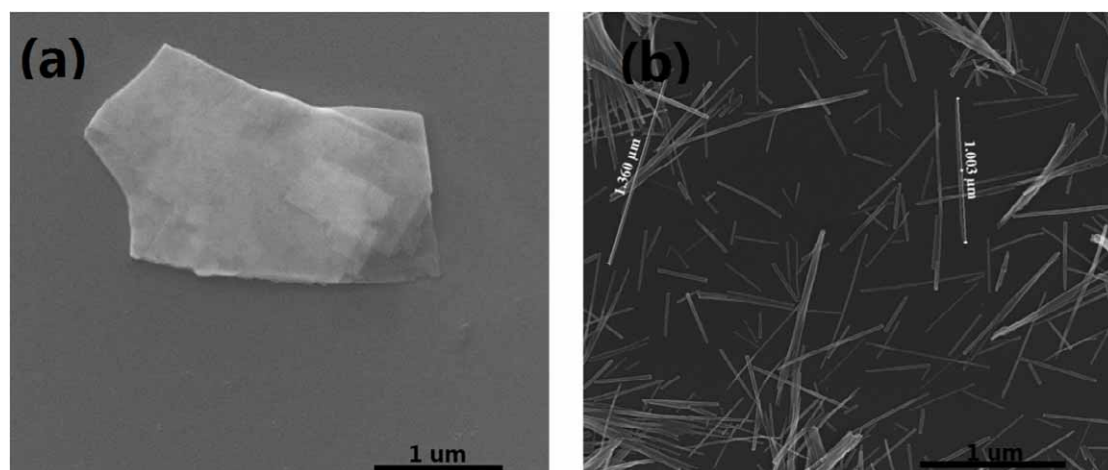


Figure S2. SEM images of the as-obtained samples: (a) pure Bi_2O_3 and (b) pure Bi_2S_3 .

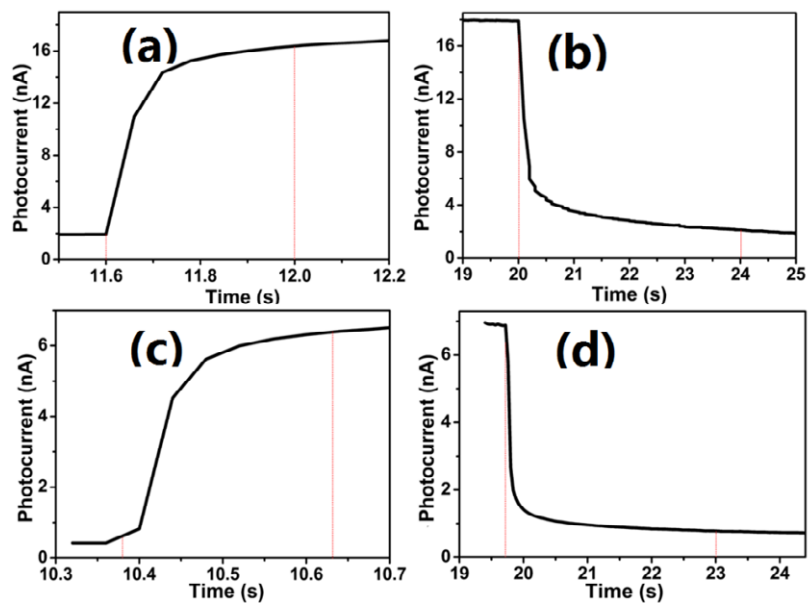


Figure S3. The enlarged view of photocurrent vs time curves under vacuum condition: (a) response time and (b) recovery time in Bi_2S_3 based device, (c) response time and (d) recovery time in mechanical mixture of Bi_2S_3 and Bi_2O_3 based device.