## **Supplementary Information**

One-step solution synthesis of bismuth sulfide (Bi<sub>2</sub>S<sub>3</sub>) with various hierarchical architectures and their photoresponse properties

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**Figure S1.** HRTEM image of near the node of individual sheaf-like  $Bi_2S_3$  MCs. (a) shows the overall HRTEM image. (b) and (c) depict the magnified images corresponding to the red and yellow dashed area, respectively. The insets are the corresponding FFT patterns.



Figure S2. The unit cell prolong 4 times along *c*-axis marked with cell constants of

orthorhombic  $Bi_2S_3$ .



Figure S3. Thickness and surface roughness characterization of hierarchical  $Bi_2S_3$ -based film.