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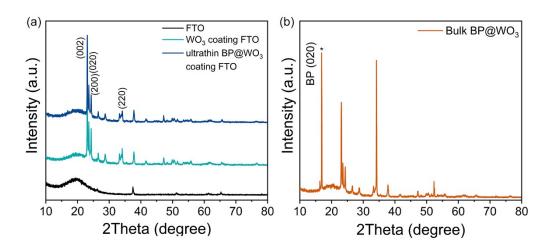
## Ultrathin black phosphorus as pivotal hole extraction layer and oxidation evolution cocatalyst boosting solar water oxidation

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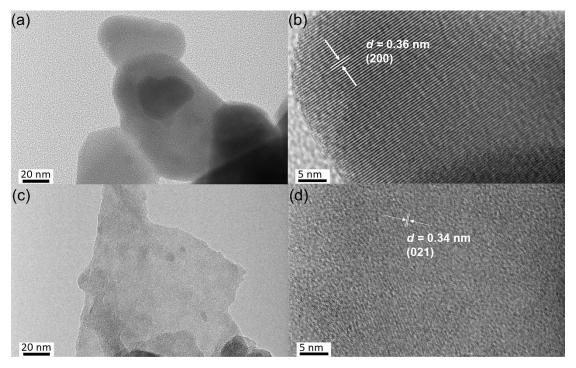
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**Fig. S1** (a) XRD patterns of the FTO substrate, WO<sub>3</sub> coating FTO substrate, and BP@WO<sub>3</sub> coating FTO substrate. (b) XRD pattern of bulk BP crystals decorated WO<sub>3</sub> photoanode.



**Fig. S2** TEM and HRTEM images of the WO<sub>3</sub> nanosheet (a), (b) and the exfoliated BP nanosheet (c), (d).