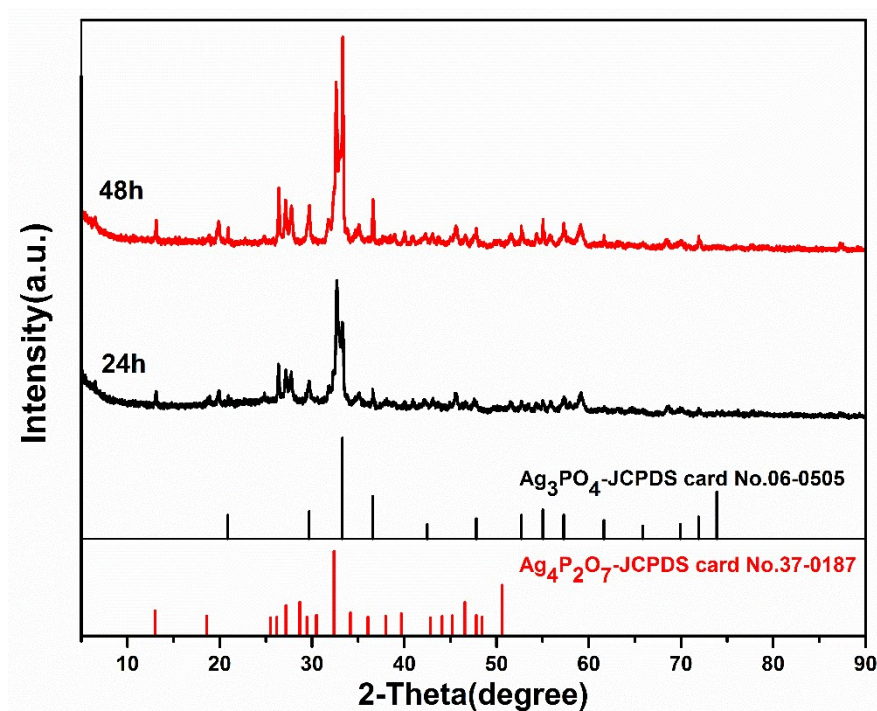


## Supplementary Information

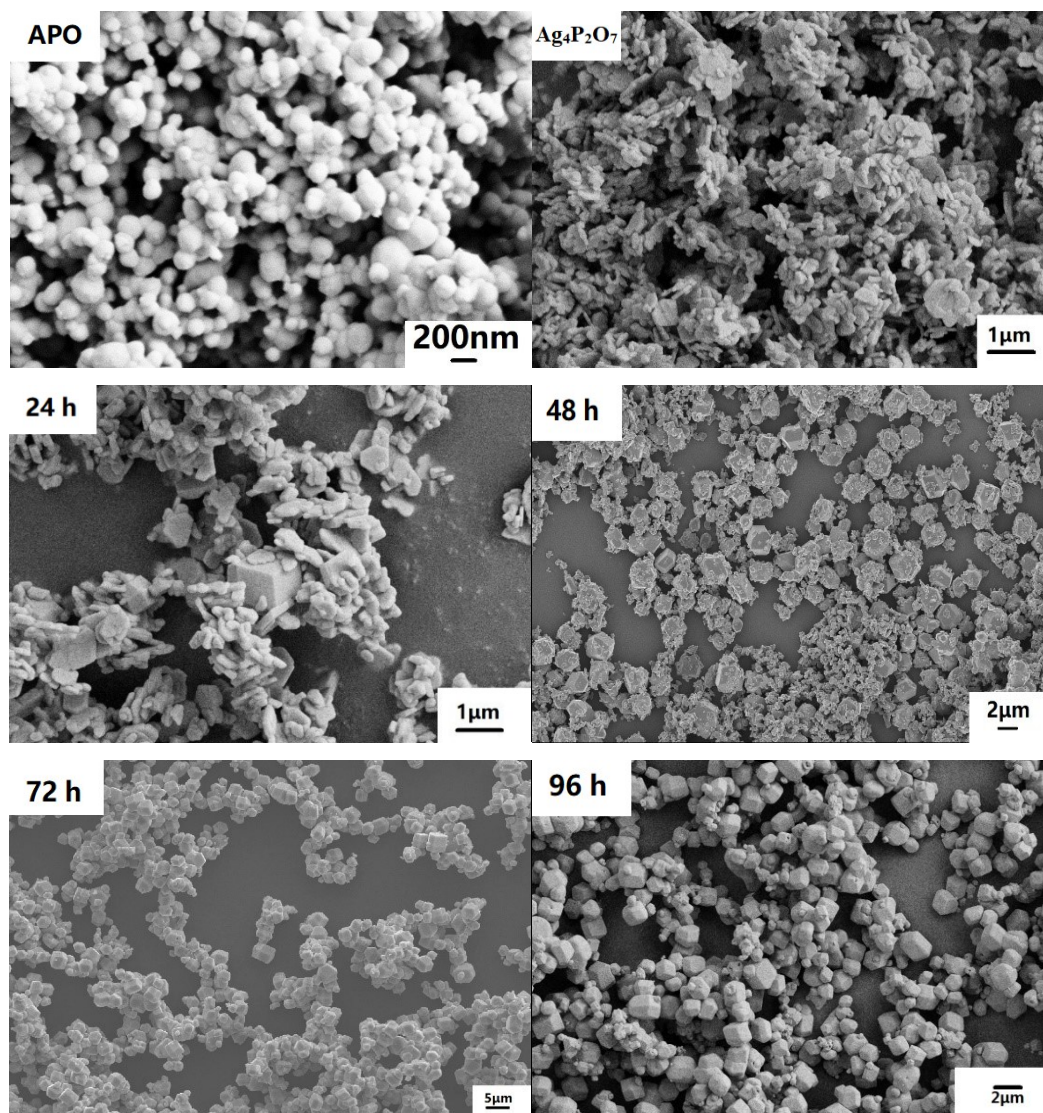
# Facile controlled synthesis of $\text{Ag}_3\text{PO}_4$ crystals with various morphologies for enhanced photocatalytic oxygen evolution from water splitting

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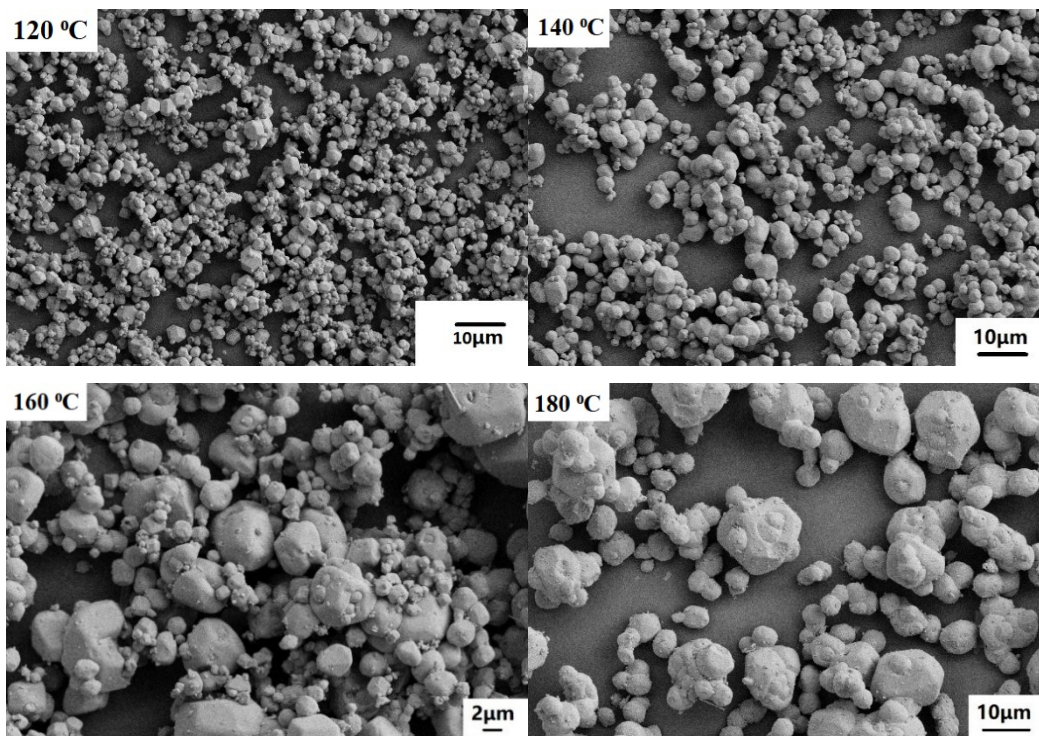
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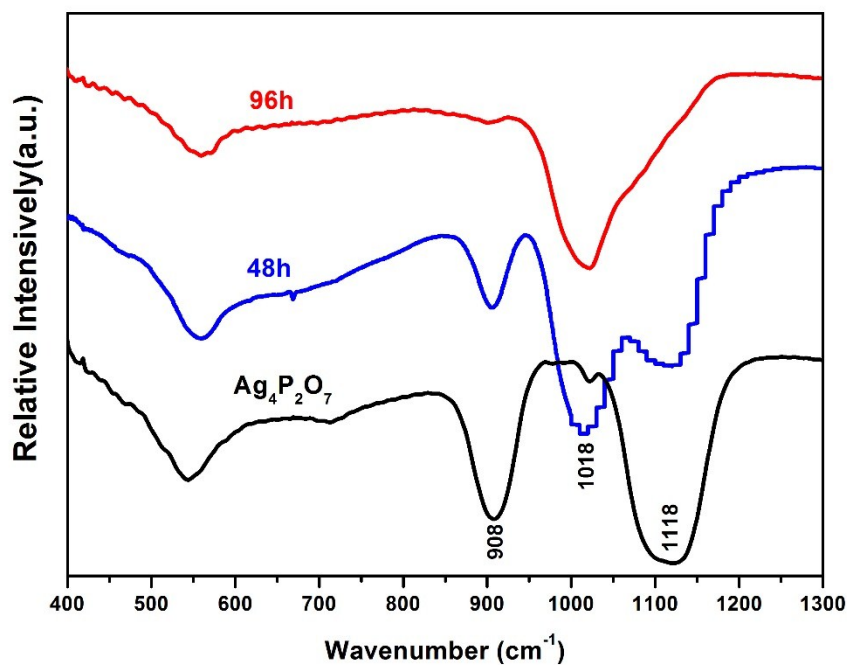
**Fig. S1** XRD patterns of different samples prepared under 100 °C in different hydrothermal time: 24h and 48h.



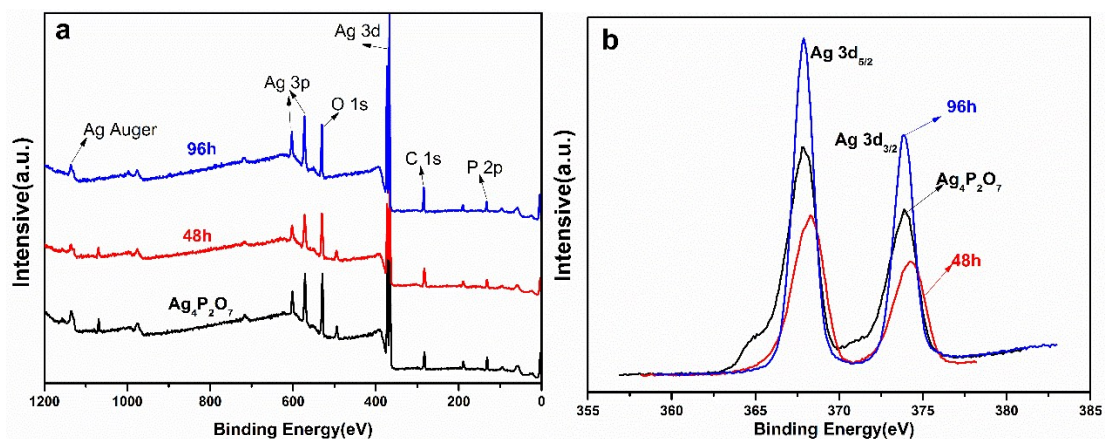
**Fig. S2** SEM images of  $\text{Ag}_4\text{P}_2\text{O}_7$ ,  $\text{Ag}_3\text{PO}_4$  synthesized by coprecipitation method (APO) and samples prepared in different hydrothermal time at 100 °C: 24h, 48h, 72h and 96h.



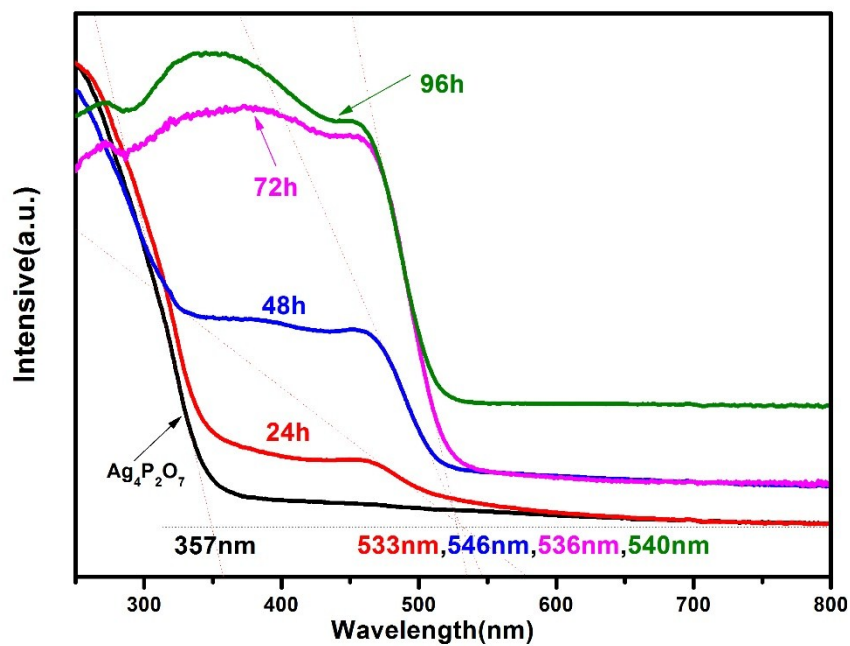
**Fig. S3** SEM images of  $\text{Ag}_3\text{PO}_4$  synthesized for 96h with different hydrothermal temperature: 120°C, 140°C, 160°C and 180°C.



**Fig. S4** FTIR spectra of  $\text{Ag}_4\text{P}_2\text{O}_7$  and  $\text{Ag}_3\text{PO}_4$  samples synthesized at 100 °C with different hydrothermal time: 48h and 96h.



**Fig. S5** XPS spectra (a) and Ag 3d XPS spectra (b) of Ag<sub>4</sub>P<sub>2</sub>O<sub>7</sub> and Ag<sub>3</sub>PO<sub>4</sub> samples synthesized at 100 °C with different hydrothermal time: 48h and 96h.; b)



**Fig. S6** UV-Vis absorption spectra of Ag<sub>4</sub>P<sub>2</sub>O<sub>7</sub> and Ag<sub>3</sub>PO<sub>4</sub> samples synthesized at 100°C with different hydrothermal time: 24h, 48h, 72h and 96h. Utilizing the formula  $E_g = 1240/\lambda_g$  (eV), where  $\lambda_g$  represents the threshold of absorption wavelength.