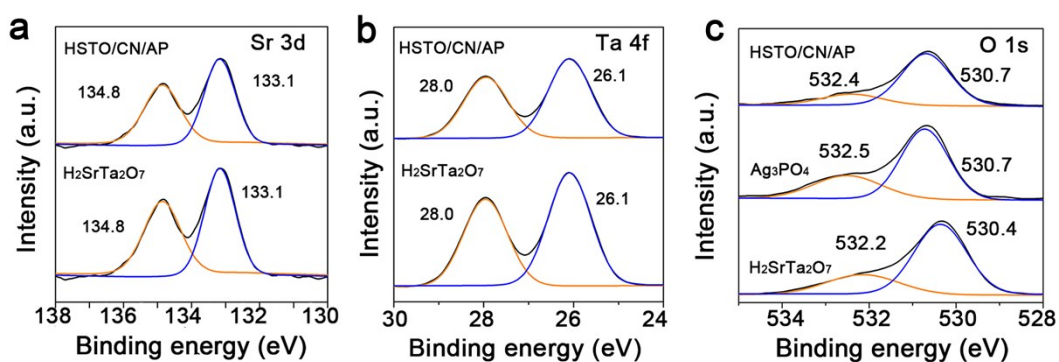
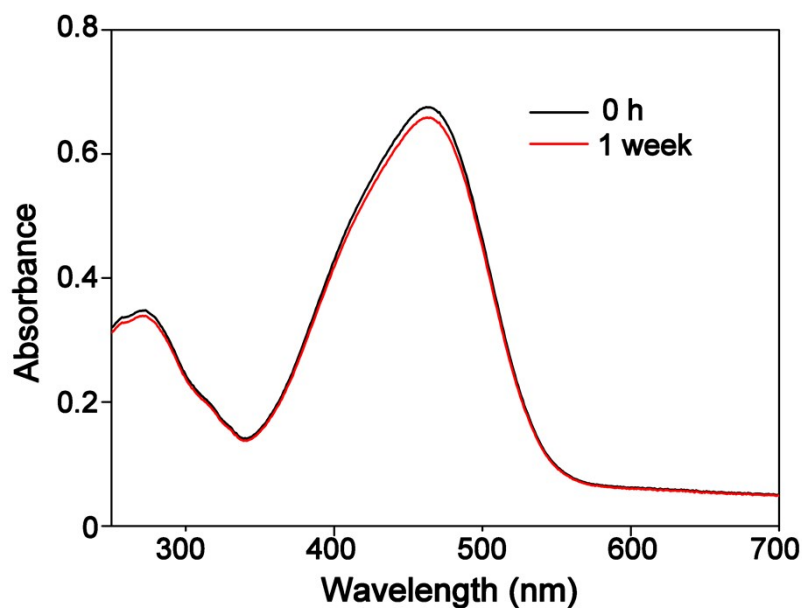


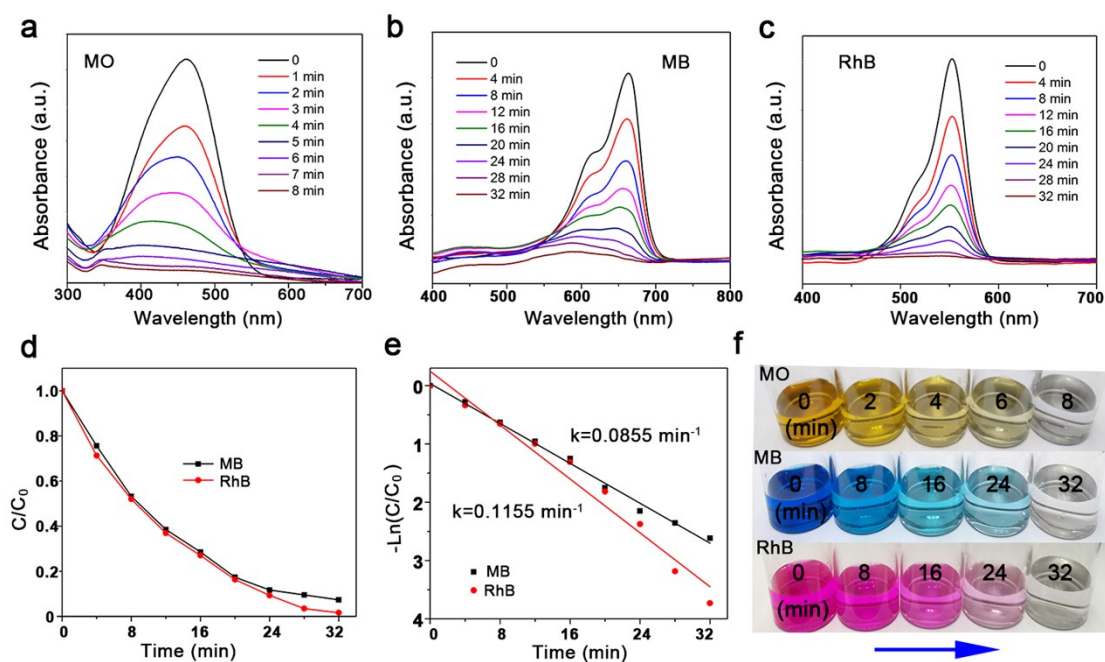
**Fig. S1** EDS spectrum of H<sub>2</sub>SrTa<sub>2</sub>O<sub>7</sub>/g-C<sub>3</sub>N<sub>4</sub>/Ag<sub>3</sub>PO<sub>4</sub> complex. The Cu signal is resulting from copper grid which coated with carbon membrane.



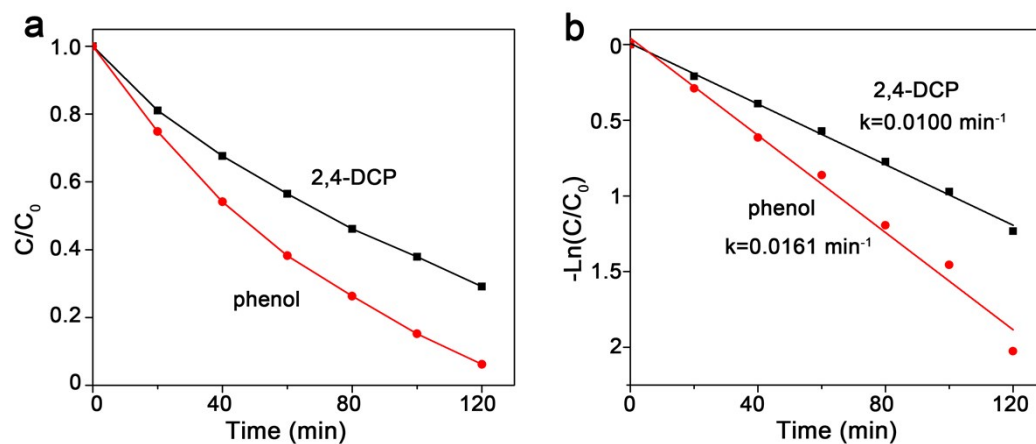
**Fig. S2** XPS spectra of (a) Sr 3d, (b) Ta 4f of and (c) O 1s of as-prepared samples.



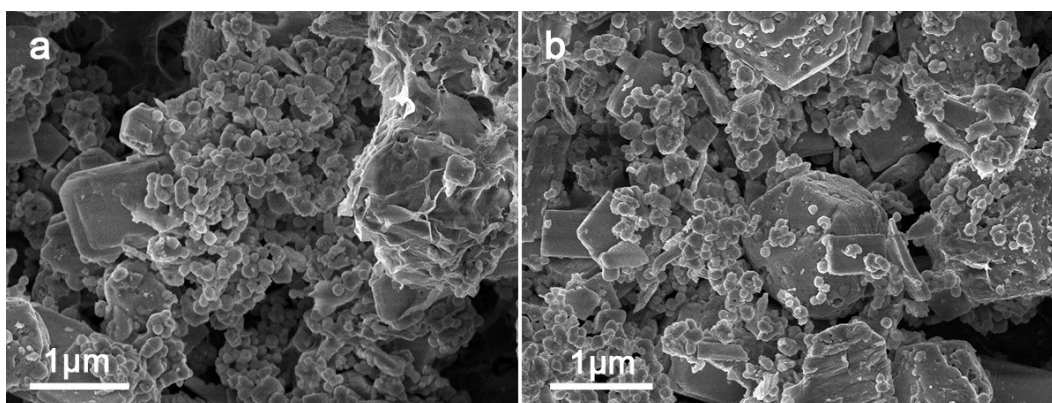
**Fig. S3** UV-vis spectrum for degradation of MO under visible-light irradiation without any catalyst.



**Fig. S4** UV-vis absorbance spectra of (a) MO, (b) MB, (c) RhB solution at different time intervals in HSTO/CN/AP system. (d) The photocatalytic degradation of MB and RhB solution based on the as-prepared HSTO/CN/AP composite. (e)  $-\ln(C/C_0)$  of MB and RhB versus irradiation time with HSTO/CN/AP composite. (f) The pictures of the color change of MO, MB and RhB solution at different time.



**Fig. S5** (a) The photocatalytic degradation of phenol and 2,4-DCP solution based on the as-prepared HSTO/CN/AP composite. (b)  $-\ln(C/C_0)$  of phenol and 2,4-DCP versus irradiation time with HSTO/CN/AP composite.



**Fig. S6** SEM images of HSTO/CN/AP composite after five cycles.