## **Supporting information**

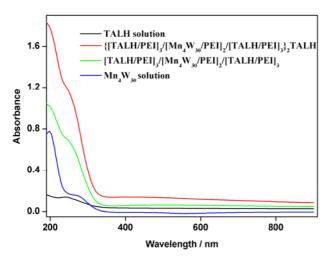


Fig. 1 UV spectrum of TALH solution,  $Mn_4W_{30}$  solution,  $[TALH/PEI]_3/[Mn_4W_{30}/PEI]_2/[TALH/PEI]_3$  films and  $[TALH/PEI]_3/[Mn_4W_{30}/PEI]_2/[TALH/PEI]_3\}_2$  TALH films.

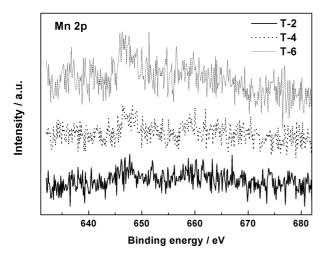


Fig. 2 XPS spectrums of Mn 2p in TiO<sub>2</sub> films.