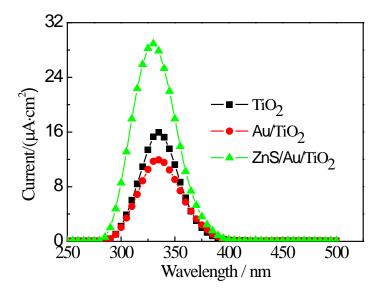
## **Supplementary information**

## Fabrication and photoelectrochemical properties of $ZnS/Au/TiO_2$ nanotube array films

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**Fig.S1** Photocurrent spectra of photoanodes with different nanotube films

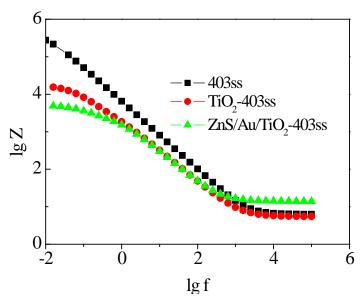


Fig. S2 The EIS results Bode-|Z| versus frequency.

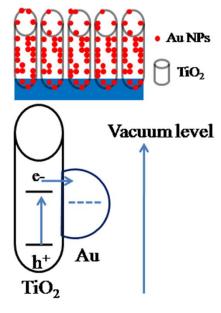


Fig. S3 Schematic diagrams of charge transfer mechanism in the  $Au/TiO_2$  nanotube array film.