Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Ordered multilayer films of hollow sphere aluminium-doped zinc oxide for photoelectrochemical solar energy conversion

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Electronic Supporting Information

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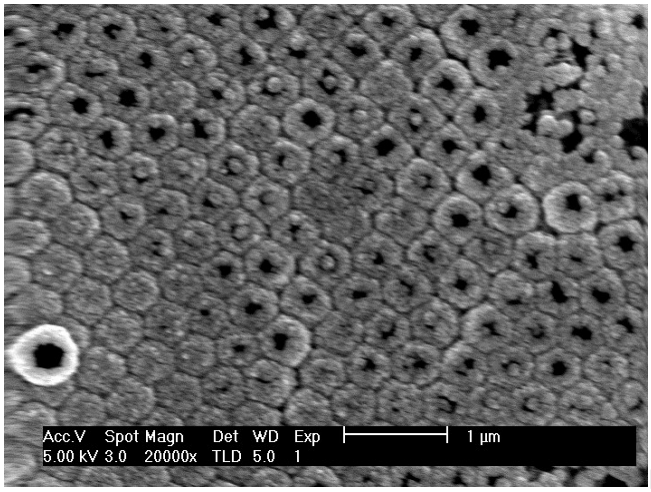
1. SEM

a) 

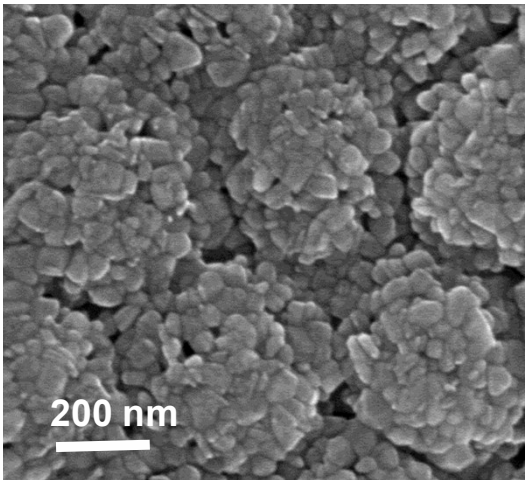
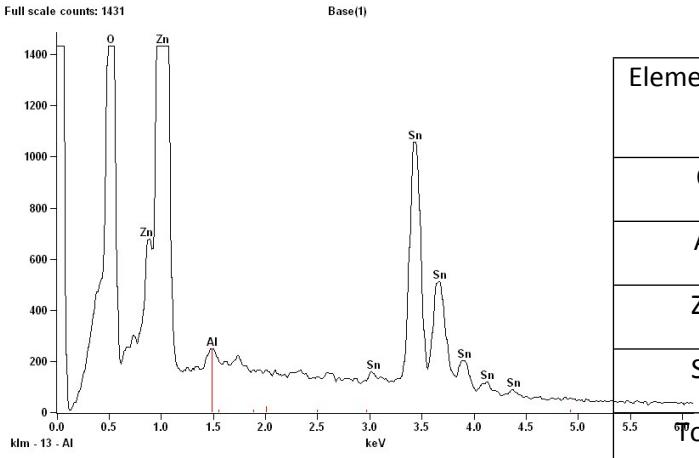
b) 

Fig. S1. a) SEM of hs-AZO; b) SEM of AZO from soaking the polystyrene template for 45 mins leading to incomplete sphere formation.



Element Line	Norm. Wt.%	Atom %
O	19.74	55.76
Al	0.38	0.63
Zn	42.51	29.38
Sn	37.37	14.23
Total	100.00	100.00

Fig. S2. EDX spectra (in SEM) of an hs-AZO electrode. Based on the ratio of ZnO:Al gives an Al doping of 1.0 at%.

2. Powder X-ray Diffraction

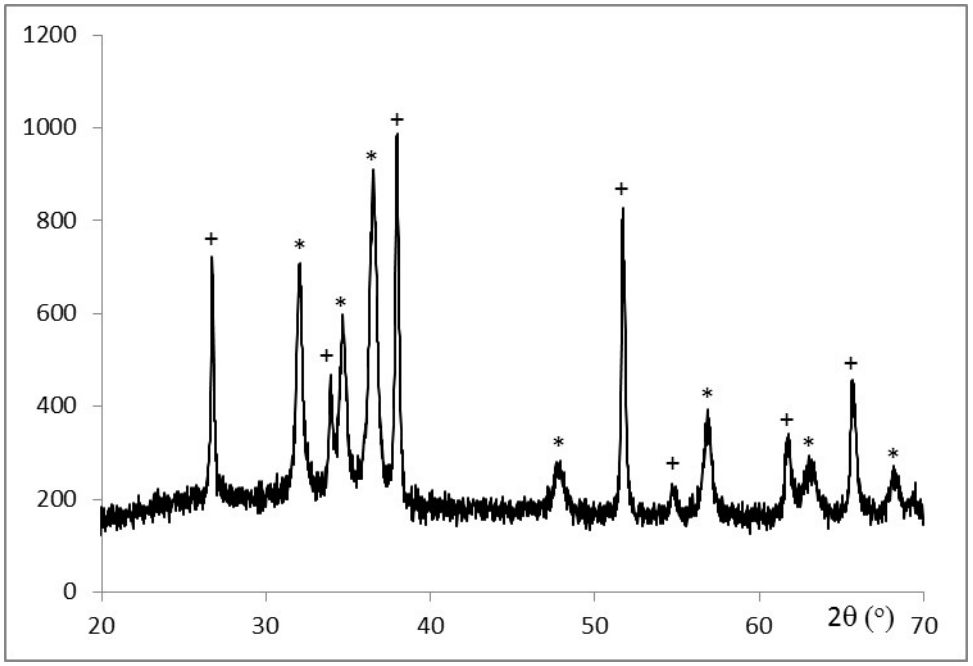


Fig. S3. hs-AZO on FTO substrate, * = ZnO JCPDS 36-1451, + = SnO_2, JCPDS 41-1445.

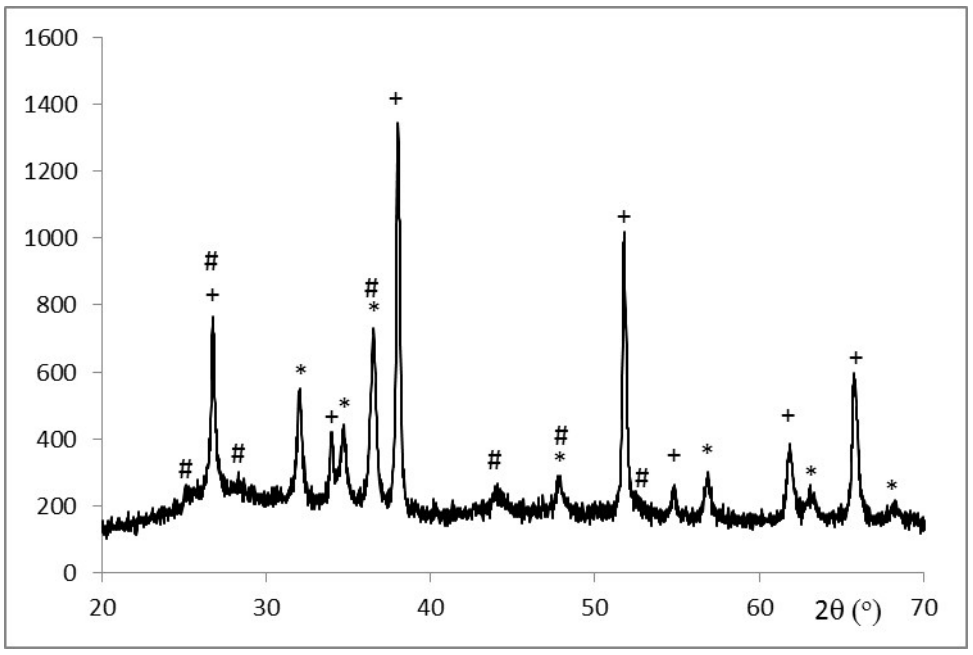


Fig. S4. CdS@hs-AZO on FTO substrate, * = ZnO JCPDS 36-1451, + = SnO_2, JCPDS 41-1445, # = CdS, JCPDS 01-075-1545.

3. Transmission Spectroscopy

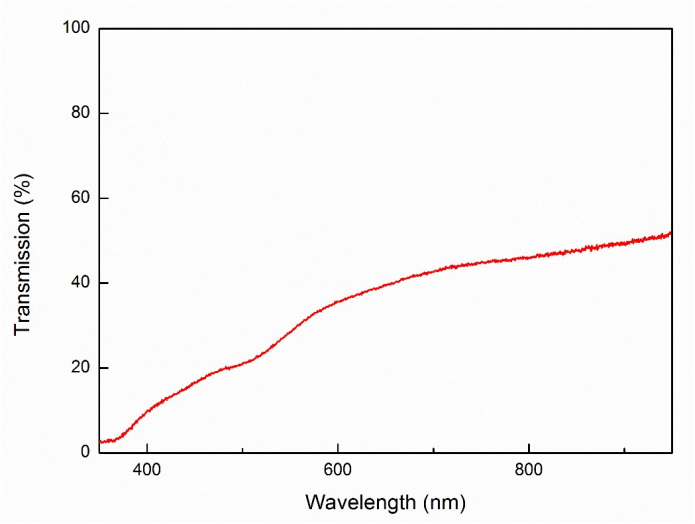


Fig. S5: UV-vis transmission spectra of hs-AZO film.

4. TEM

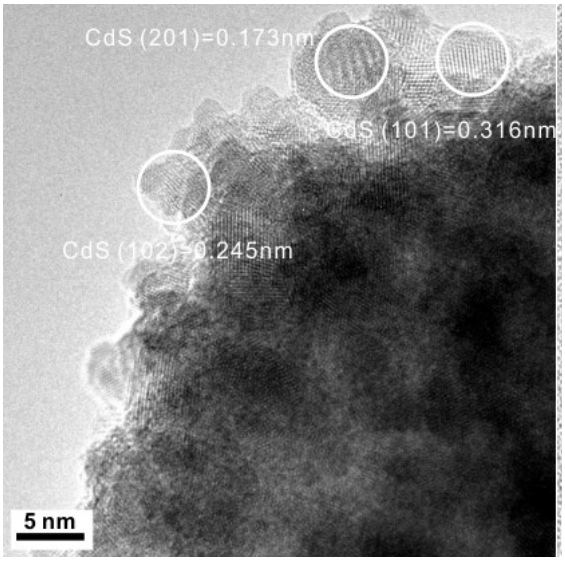


Fig. S6. Additional TEM of CdS@hs-AZO showing CdS particles on surface of hs-AZO.

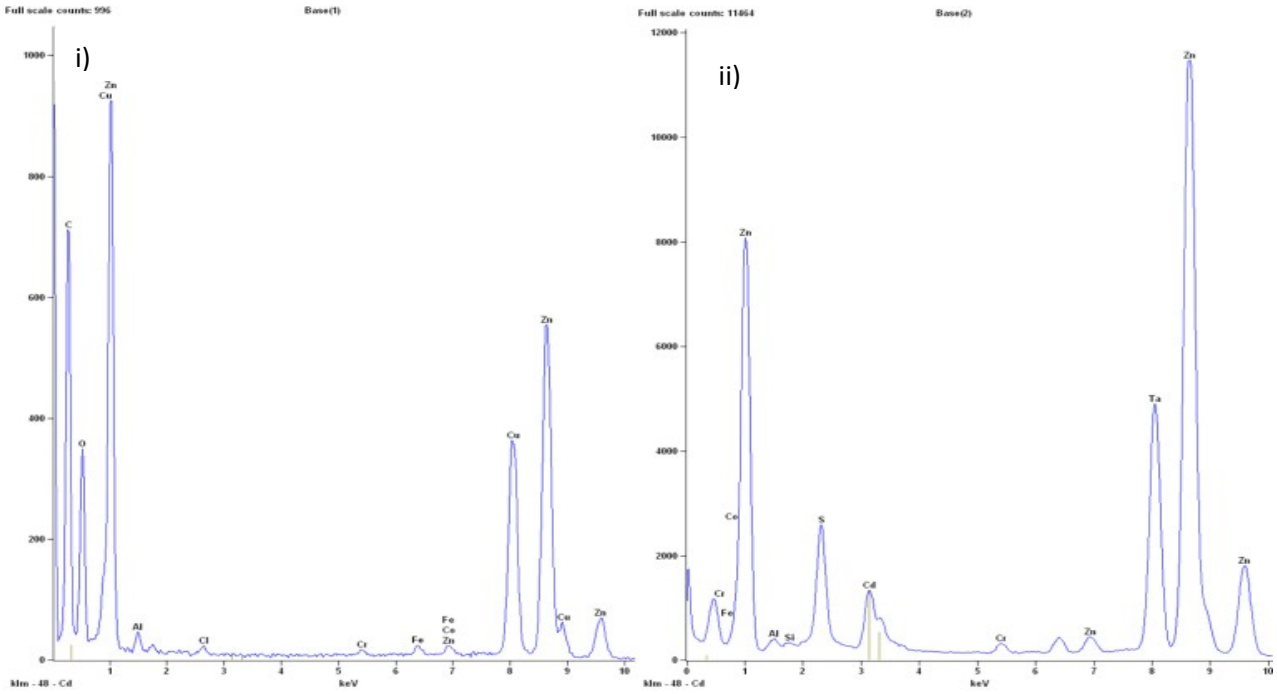


Fig. S7. EDX spectra (in TEM) of i) hs-AZO and ii) CdS@hs-AZO fragments scraped from an electrode.

5. Photoelectrochemistry

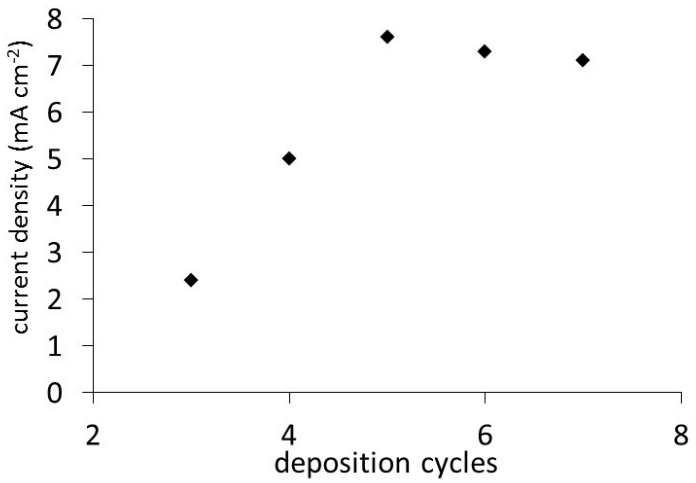


Fig. S8. Current density as a function of deposition cycles.

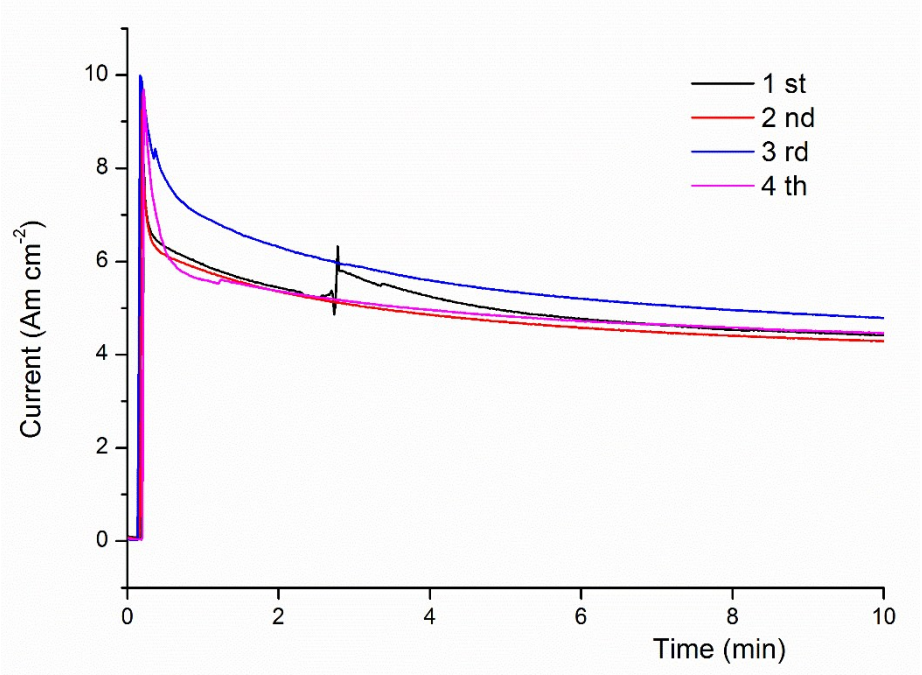


Fig. S9 Photostability of CdS@hs-AZO at 0 V vs Ag/AgCl, 100 mWcm^{-2} in Na_2S/Na_2SO_3 (0.25/0.35 M). After each experiment 1-4 the electrode was soaked in the electrolyte for 5 mins to re-establish the initial photocurrent.