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Supplementary Information

Influence of PbS layer on optical and electronic properties of ZnO@PbS core-shell nanorods thin film

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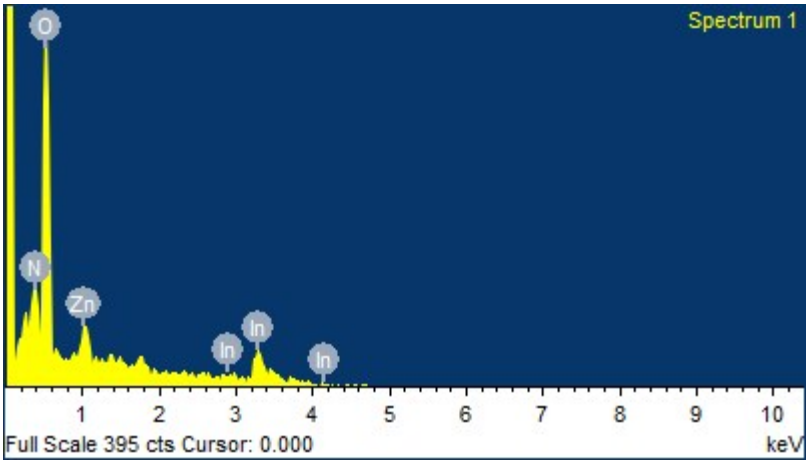

Figure S1 EDS of ZnO seed layer

It has been observed that with the increase of PbS shell thickness, though the solar cell efficiency improved but its efficiency is lower than the ZnO@PbS@Dye thin film based solar cell.

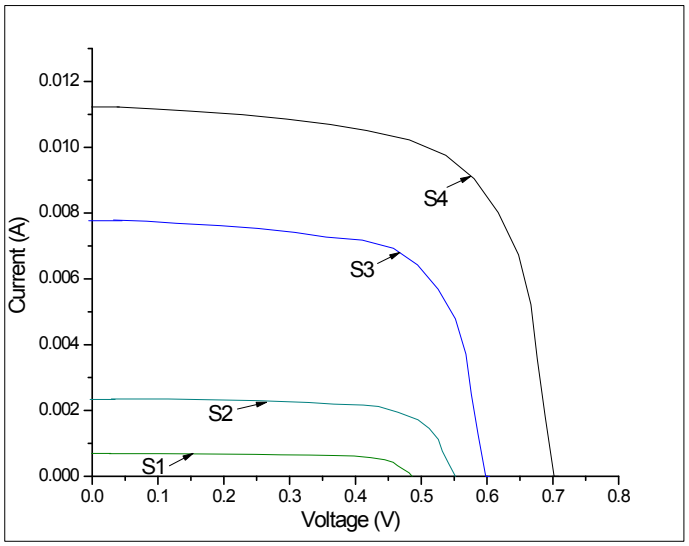

Figure S2 Photocurrent - voltage response of the DSSC cell with ZnO@Dye and ZnO@PbS@Dye nanostructure thin film

It has been found that the short circuit current (J_{sc}) and open circuit voltage (V_{oc}) increased gradually with an increase in the number of PbS layers. The photo current generation of ZnO@Dye is lower than ZnO nanorods thin film because ZnO has visible blindness. The thin film with 10 PbS layers showed maximum fill factor (FF) and efficiency. The maximum energy conversion efficiency and fill factor was 6.06 % and 0.76 respectively for ZnO@PbS core-shell nanorods with 10 layers of PbS. Since in this dye has not been used, the enhancement of open circuit voltage and overall performance of solar cell is only due to PbS layer. The performance of all samples is listed in table 1S".

Table 1S Averaged photovoltaic parameters of DSSc based on electrolyte made of 1 M Na_2S and 1 M S in aqueous solution

Sample Name	V_{oc} (V)	J_{sc} (mA)	FF	Efficiency (η)
S1	0.53	0.71	0.72	0.27
S2	0.56	2.35	0.75	0.97
S3	0.61	7.81	0.73	3.48
S4	0.71	11.23	0.76	6.06