Electronic Supplementary Information

Band Edge Tuned $Zn_xCd_{1-x}S$ Solid Solution Nanopowders for Efficient Solar Photocatalysis

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Table S1: Previous Literature Survey

Highest performance in terms of photocatalyst	Synthesis	Crystal Phase	Particle Size	Visible-light photocatalytic activity		Ref
				Dye	Time	
$Zn_{0.21}Cd_{0.79}S$	Supercritical solvothermal	Wurtzite	9.5	RhB	2 h	10
$Cd_{0.8}Zn_{0.2}S$	Facile self-assembly route	Wurtzite	85±15	RhB	20 min	15
Cd : Zn = 3:1	Hydrothermal	Wurtzite	15	MO	5 h	18
$Zn_{0.28}Cd_{0.72}S$	Microwave Synthesis	Wurtzite	10	MO	6 h	30
$Zn_{0.2}Cd_{0.8}S$	Solvothermal	Hexagonal	-	MB	1 h	31

Table S2: EDS of $Zn_xCd_{1-x}S$

x	**0.0**	**0.2**	**0.4**	**0.6**	**0.8**	**1.0**
Zn (atom %)	0.00	11.52	18.32	29.18	37.97	49.61
Cd (atom %)	49.73	37.26	32.33	19.01	9.73	0.00
S (atom %)	50.27	51.22	49.45	51.81	52.31	50.39

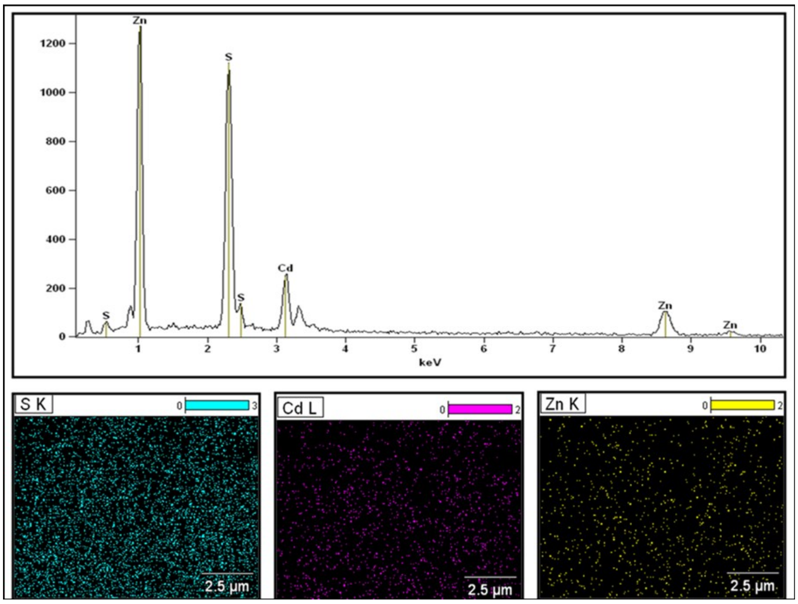

Figure S1: EDS composition analysis and elemental distribution of $Zn_{0.8}Cd_{0.2}S$.

The EDS analysis gives knowledge about the compositional percentage of Zinc Cadmium Sulfide in Table S1. It determines that atom percentage for $Zn_xCd_{1-x}S$ is almost similar to the desired value of x. EDS spectra and elemental mapping of composition x=0.8 is displayed in Figure S1.

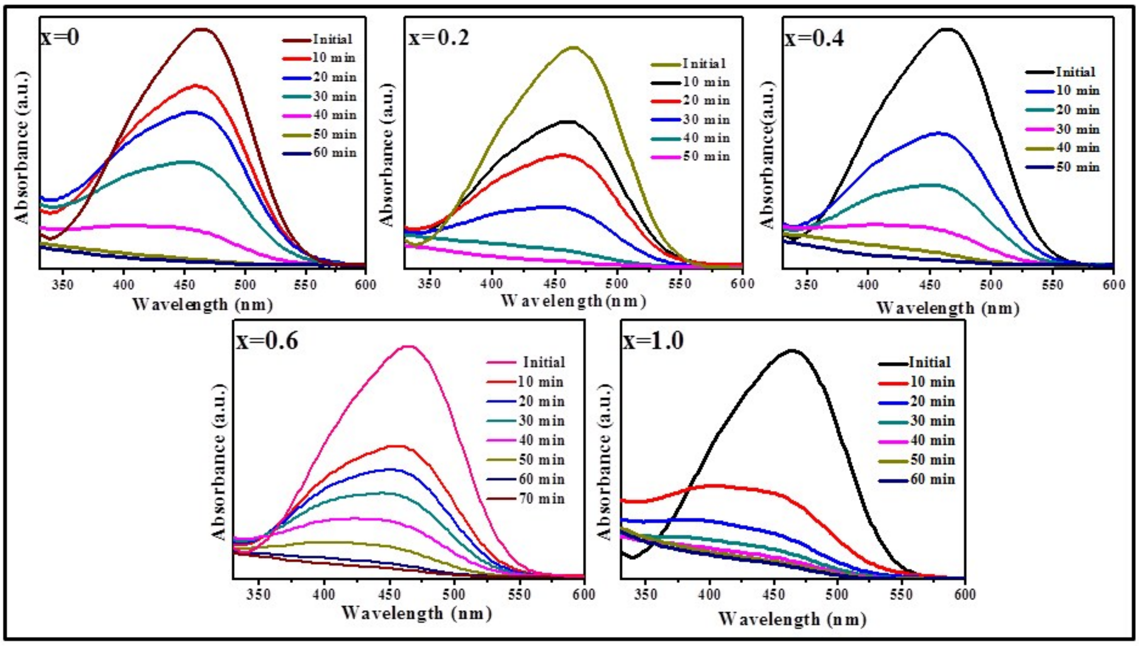

Figure S2: Absorbance Spectra of MO in presence of $Zn_xCd_{1-x}S$ for different composition(x) under sunlight irradiation.

The degradation profile of Methyl Orange in presence of catalyst $Zn_xCd_{1-x}S$ for different x value under sunlight irradiation is shown in Figure S2. It confirms about the fast dye degradation as well as catalytic activity of these sulfide materials. All samples are good catalysts and it degrades the dye by almost above 90 % within 1 h under natural sunlight. The rate of degradation is also noticeable for all the samples.