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Supplementary Information

Unravelling the visible light-assisted catalytic prowess of n-n type In_2S_3/CeO_2 Z-scheme heterojunction towards organic and inorganic water pollution mitigation.

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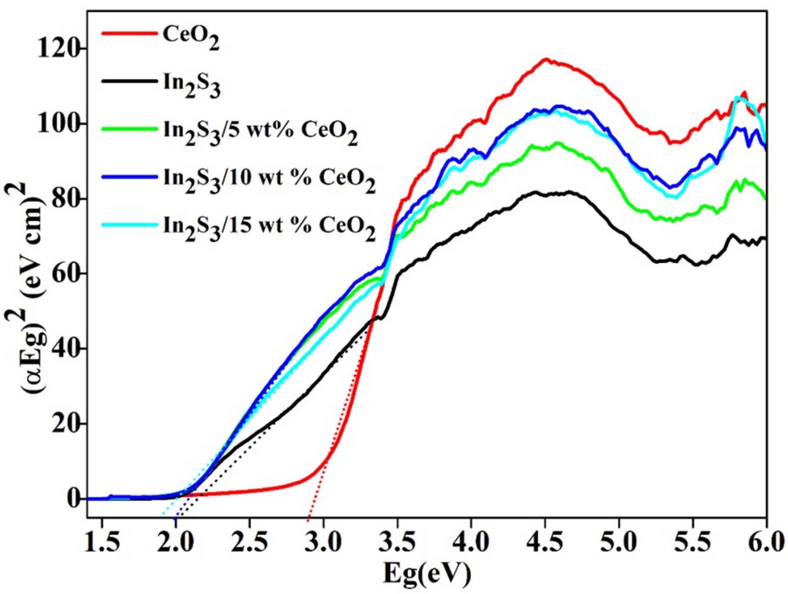

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Fig. S1. Tauc plots spectrum of In_2S_3, CeO_2, In_2S_3/wt%CeO_2 nanocomposites.

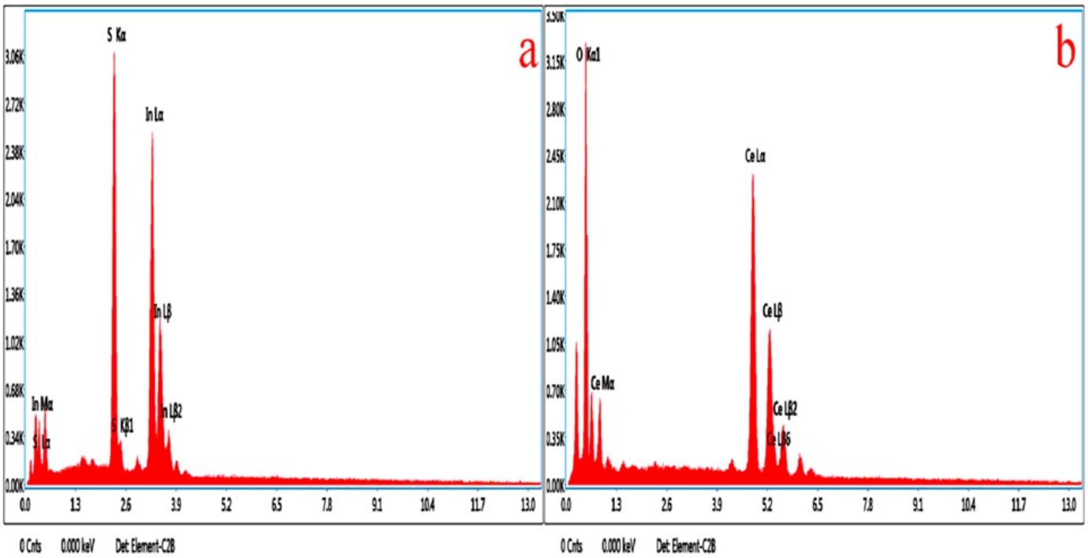

Fig S2. a) EDAX of pure In_2S_3 b) EDAX of pure CeO_2

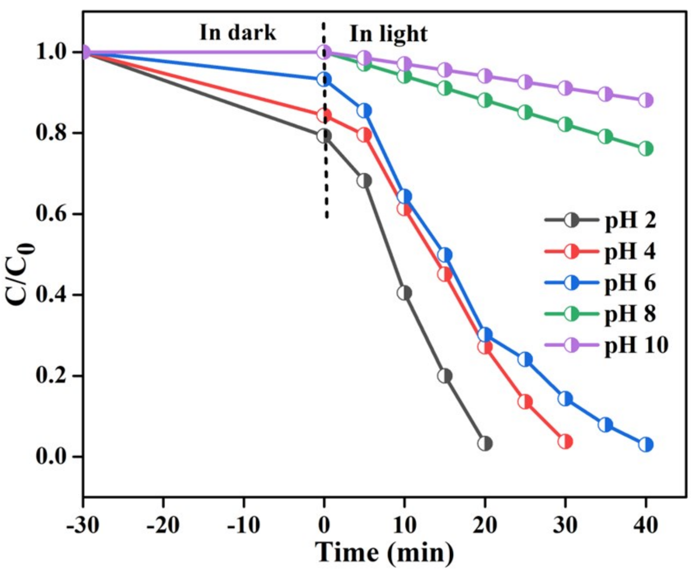

Fig S3: Effect of pH in the photoreduction of Cr(VI).

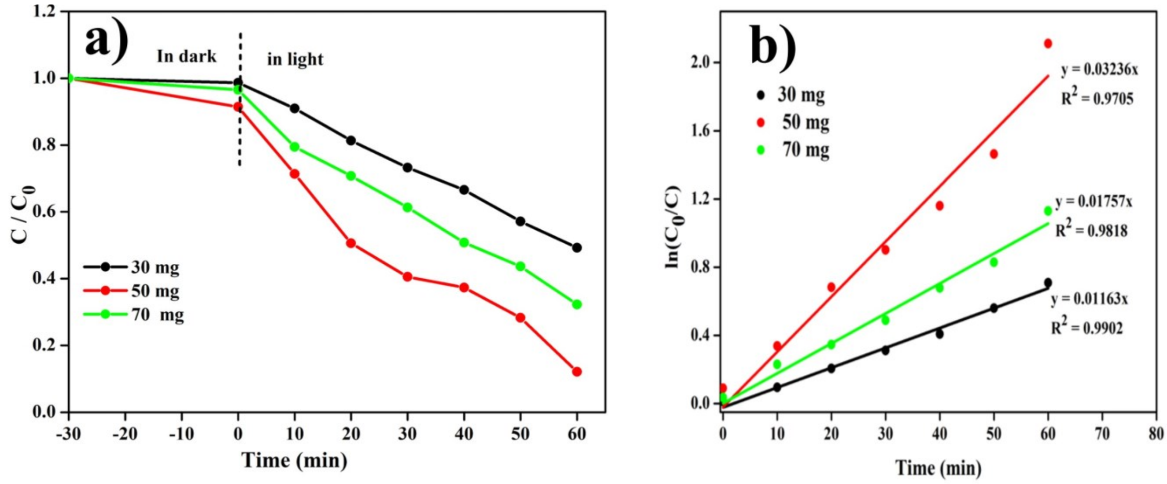

Fig S4. a) Effect of dose variation of In2S3/10 wt % CeO2 b) Kinetics of effect of dose variation of In2S3/10 wt % CeO2.

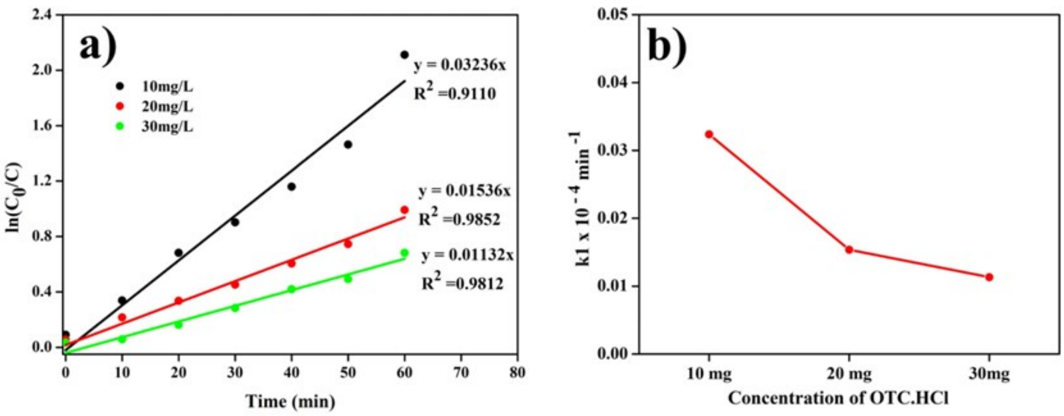

Fig S5. a) Kinetic curve of effect of initial concentration of OTC with the photocatalyst In2S3/10wt% CeO2 b) Rate of degradation for variation of initial concentration of OTC.

Table S1. Kinetic constant and efficiency values for the photoreduction of Cr(VI) over the prepared photocatalysts.

Photocatalyst	Rate constant (k) (min^{-1})	R^2	Degradation efficiency (%)
In_2S_3	0.03078	0.9506	70.7
CeO_2	0.01619	0.9941	46.9
In_2S_3/5wt%CeO_2	0.03678	0.9693	76.7

In_2S_3/10wt%CeO_2	0.08307	0.9369	97.5
In_2S_3/15wt%CeO_2	0.04993	0.9745	85.4

Table S2. Kinetic constants and degradation efficiency values for the photodegradation of OTC.

Photocatalyst	**Rate constant (k) (min^{-1})**	**R^2**	**Degradation efficiency (%)**

In_2S_3	0.01480	0.9787	61.0
CeO_2	0.00835	0.9964	39.0
In_2S_3/5 wt % CeO_2	0.01954	0.9955	70.4
In_2S_3/10 wt % CeO_2	0.03236	0.9705	87.9
In_2S_3/15 wt % CeO_2	0.02372	0.9818	78.3

Table S3. Comparison of Photocatalytic efficiency of Photocatalyst in this work with other relevant work:

Photocatalyst	**Catalyst (g/L)**	**Pollutant**	**Light Source**	**Time (min)**	**% degradation**	**Rate Constant (min^{-1})**	**Ref**
In_2S_3 / CeO_2	0.5	Cr (VI) – 40mg/L	300W Tungsten Lamp	40	97.45%	0.08307	This work
In_2S_3 / CeO_2	0.5	OTC.HCl –10mg /L	300W Tungsten Lamp	60	87.89%	0.03236	This work
Ag/AgBr/$BiVO_4$	0.5	Cr (VI) – 10mg/L	300W Xe lamp	60	91.72%	0.0405	47
Ag/AgCl/$BiVO_4$	1	OTC.HCl –20mg /L	1000W Xe lamp.	120	91	0.0294	47
ZnO/$AgVO_3$	0.5	Cr (VI) – 20mg/L	300 W Xe lamp	90	92.77	0.04624	42
CdS-SnO_2	0.4	Cr (VI) – 10mg/L	300W Xe lamp	20	95%	0.0581	43
rh-In_2O_3	0.5	OTC.HCl –10mg /L	300 W high-pressure mercury lamp	120	89.5%	0.0148	44
Co_3O_4/TiO_2/GO	0.5	OTC.HCl –10mg /L	300W Xe lamp	90	91%	0.0272	45