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

Supplementary Information

Synthesis, Stability and Intrinsic Photocatalytic Properties of Vanadium Diselenide

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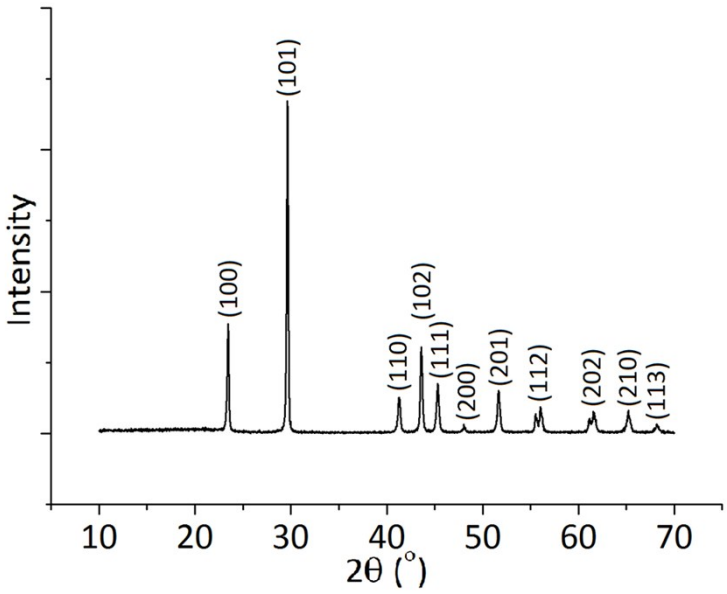

Fig.S1 XRD pattern of as-synthesized elemental Se (JCPDS No. 86-2246).

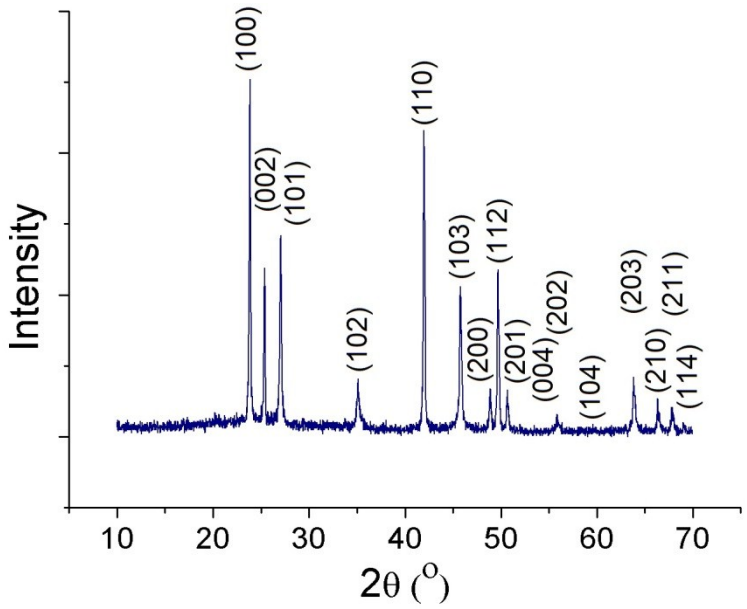

Fig. S2 XRD pattern of as-synthesized CdSe (JCPDS No. 77-2307) in the same hydrothermal method with the precursor of $CdCl_2 \cdot 2.5\ H_2O$.

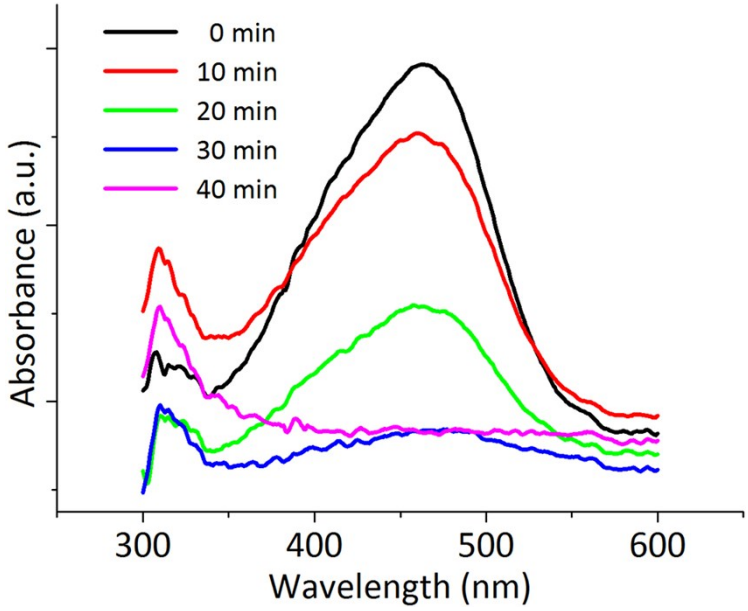

Fig.S3 Time-dependent absorption spectra of 3 mmol L^{-1} VSe_2 and 28mg L^{-1} MO in DW.

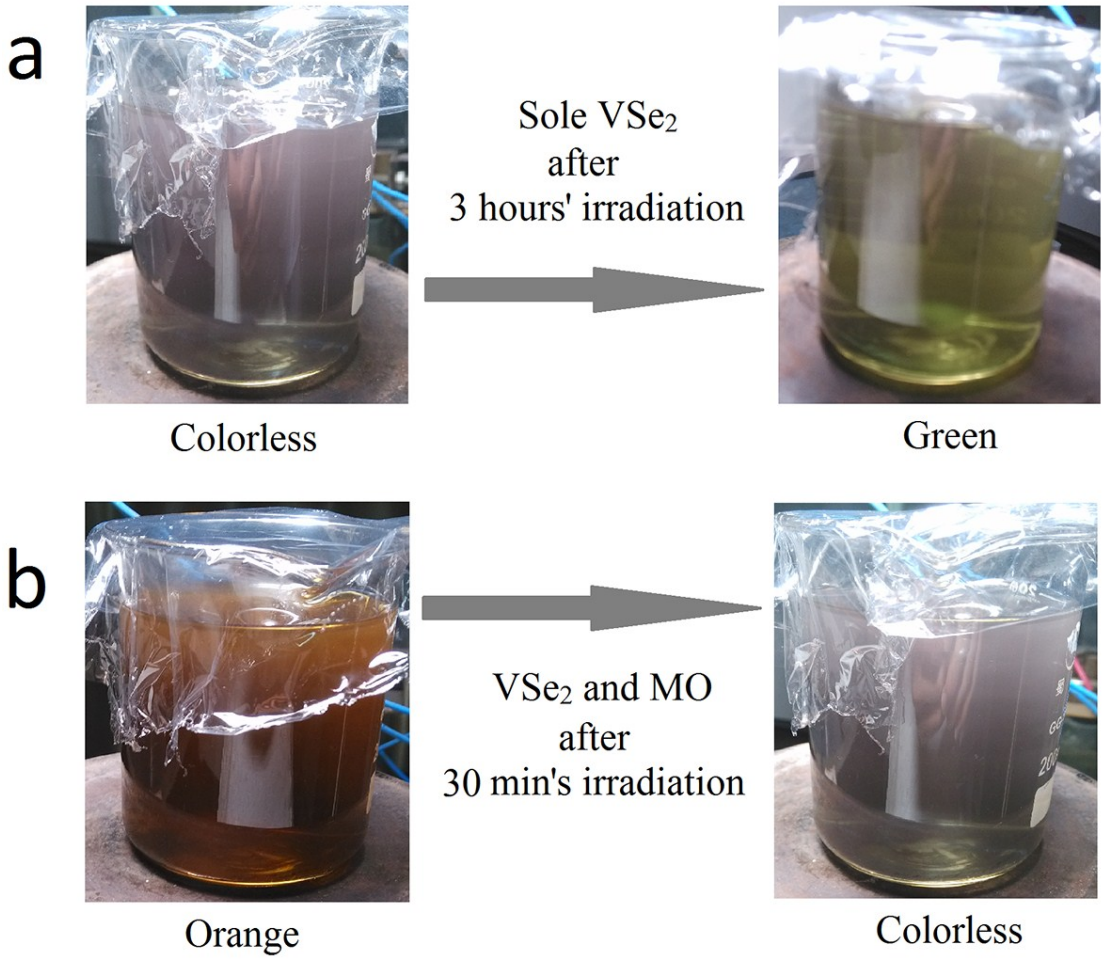

Fig.S4 Images of 3 mmol L^{-1} of (a) sole bulk VSe_2 and (b) bulk VSe_2 and 28 mg L^{-1} MO in DW, in which the left images are taken right at the beginning of the irradiation in visible-light while the right ones after irradiation.

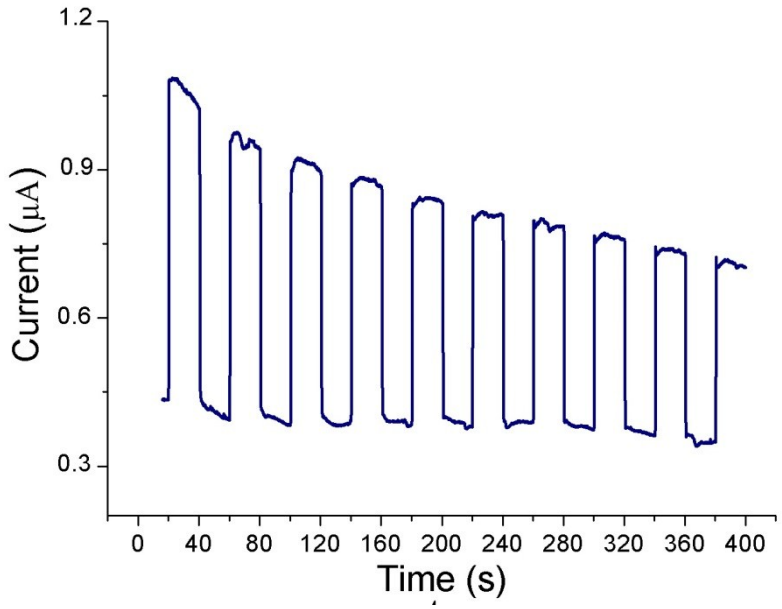

Fig. S5 Photocurrent curve of VSe_2 gained from a conventional photocurrent test that a drop of as-synthesized VSe_2/H_2O (with the weight of VSe_2 of about 0.4 mg) was placed onto a conductive glass, followed by the test with a electrochemical work station (CHI660, Shanghai) operating at an initial voltage of 1.0 V under a lamp with a power of about 800 W, in which the current in the valleys is generated in dark and the one on the plateau is generated in the visible-light.

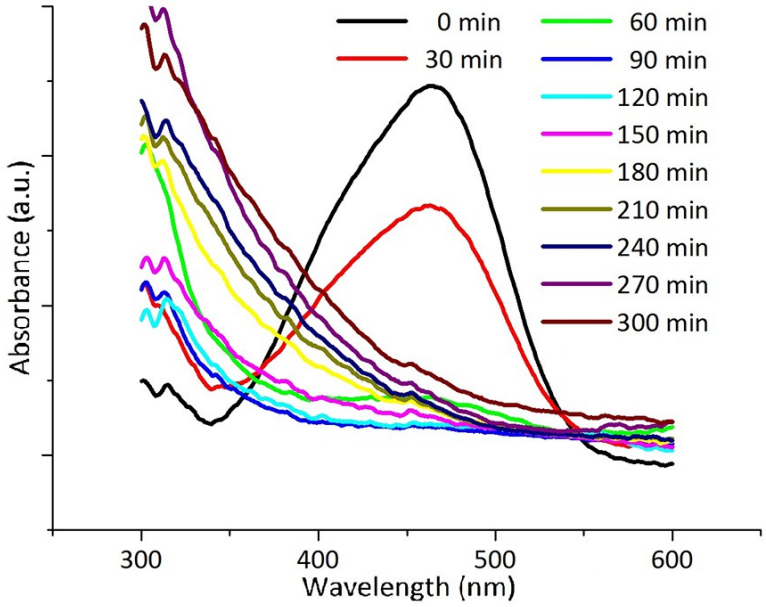

Fig.S6 Time-dependent absorption spectra of 2 mmol L^{-1} VSe_2 and 28 mg L^{-1} MO in DW.

Table S1 Data for the calculations about the percentages of VSe_2 in different samples.

XRD pattern		Percentage	1T-VSe_2		e-Se	
			I%	RIR	I%	RIR
Fig. 4a	Blue	1%	1%	7.07	95%	7.10
	Red	80%	89%	7.07	23%	7.10
Fig. 4b	Blue	93%	50%	7.07	4%	7.10
	Red	99%	97%	7.07	1%	7.10
Fig. 5a	Red	100%	91%	7.07	< 1%	7.10
	Brown	94%	93%	7.07	6%	7.10
	Blue	83%	43%	7.07	9%	7.10
	Orange	46%	83%	7.07	96%	7.10
	Pink	1%	1%	7.07	95%	7.10
	Black	0%	< 1%	7.07	89%	7.10
Space Group		1T-VSe_2	164	JCPDS No.	1T-VSe_2	89-1641
		e-Se	152		e-Se	86-2246