Supporting Information

Boosting Piezocatalytic Hydrogen Production via Bismuth Vacancy-Engineered BiOCl-Bi_2S_3 Heterojunctions Fabricated by a Light-Induced Deposition Strategy

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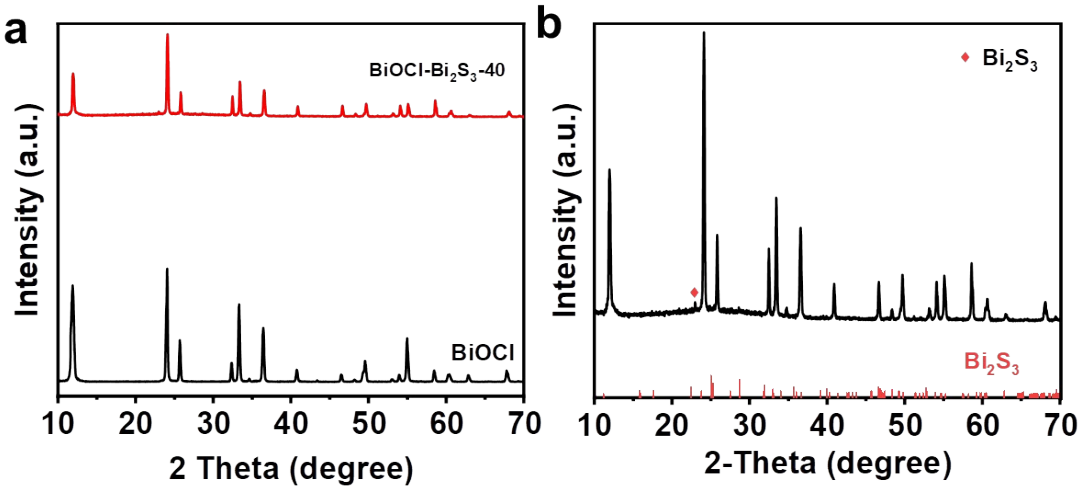

Fig. S1. (a) XRD patterns of BiOCl, and BiOCl-Bi_2S_3 heterojunction, (b) XRD patterns of BiOCl-Bi_2S_3-40.

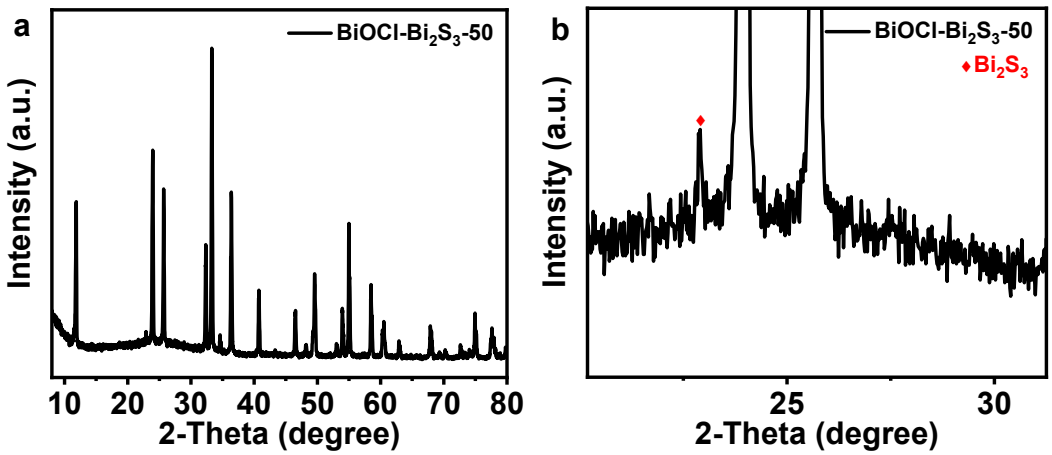

Fig. S2. (a) XRD patterns of BiOCl-Bi_2S_3-50; (b) Enlarged XRD patterns of BiOCl-Bi_2S_3-50.

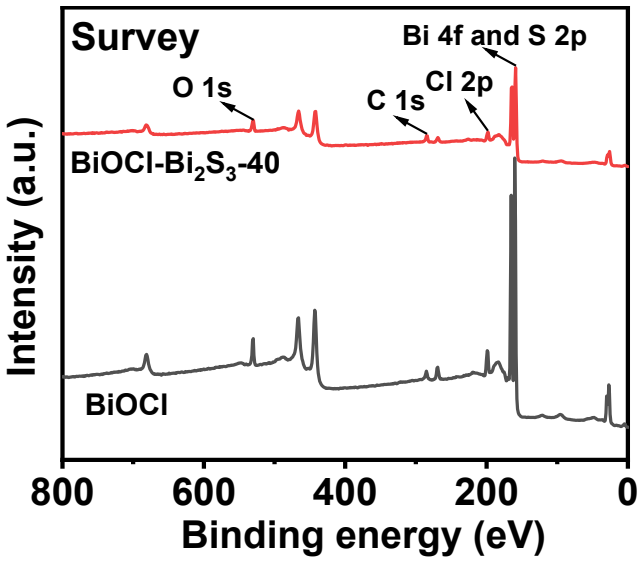

Fig. S3. XPS survey spectrum of BiOCl, and BiOCl-Bi_2S_3 heterojunctions

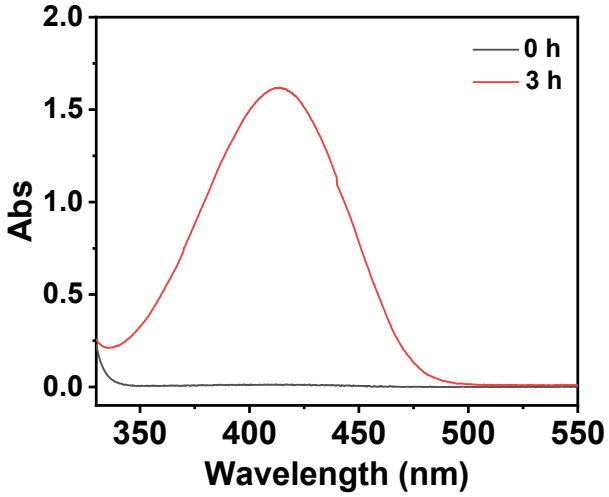

Fig. S4. UV-vis absorption spectra of methanol before and after reaction for 3 hours.

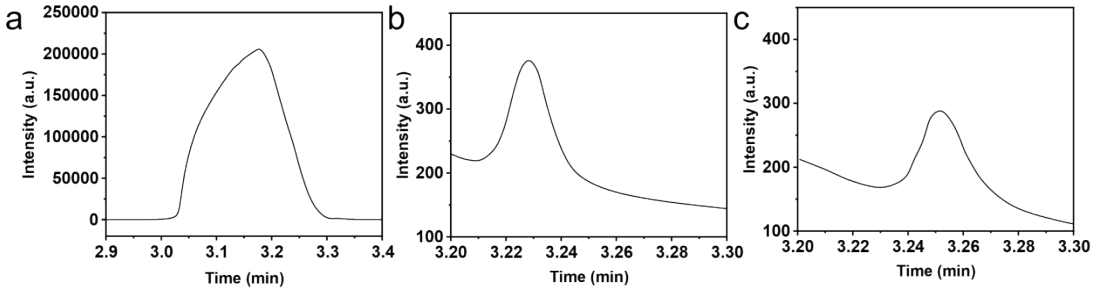

Fig. S5. (a) The GC signal for methanol oxidation product; the GC signal for oxidation product of (b) EtOH and (c) TEOA.

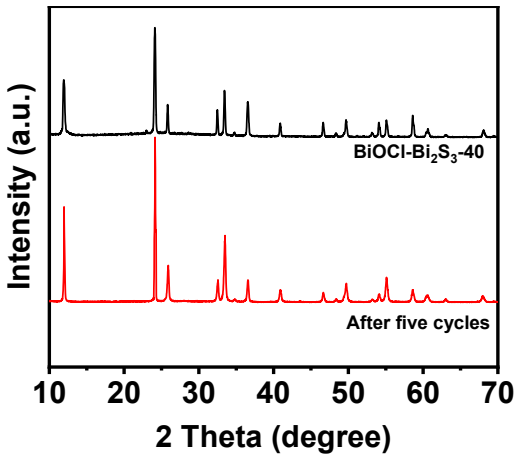

Fig. S6. XRD patterns of BiOCl-Bi_2S_3-40 before and after 5 cycles.

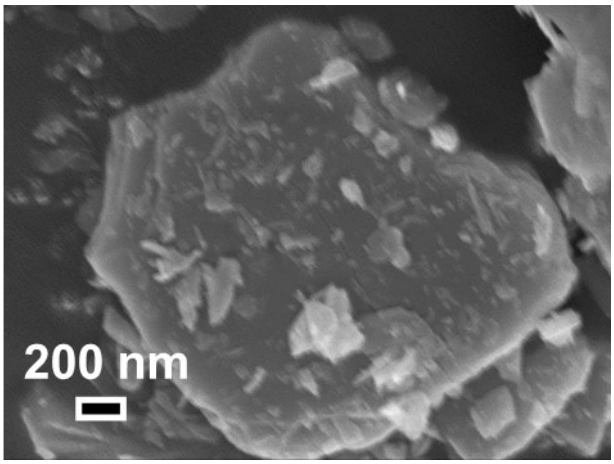

Fig. S7. SEM images of BiOCl-Bi_2S_3-40 after 5 cycles.

Table S1. Piezocatalytic H_2 production rates comparison of BiOCl-Bi_2S_3-40 heterojunction with previous reported piezocatalytic materials.

Piezocatalysts	**Composition and structure**	**Conditions**	**H_2 evolution rates (μmol/g/h)**	**Sacrificial Agents**
BMO-0.1BTO[1]	Heterojunction	300 W	152.57	MeOH
O-MoS_2-180[2]	Oxygen-incorporated	40 kHz, 150 W	46.1	None
$SrSn_{0.01}Ti_{0.99}O_3$[3]	Sn doped	40 kHz, 80 W	101.46	None
BSFMO-2[4]	Sm and Mn codoped	40 kHz, 150 W	550	TEOA
$SrTiO_3$[5]	Oxygen Vacancy	40 kHz, 300 W	540	None
MoS_2[6]	Sulfur Vacancy	40 kHz, 80 W	1423	MeOH
BIOVO/NM[7]	Heterojunction and Oxygen Vacancy	300 W	420.6	None
$Sr_{0.5}Ba_{0.5}Nb_2O_6$/ $Sr_2Nb_2O_7$[8]	Heterojunction and Oxygen Vacancy	40 kHz, 110 W	109.4	TEOA
$Bi_{1/2}Na_{1/2}TiO_3$[9]	Heterojunction and Oxygen Vacancy	40 kHz, 110 W	506.7	MeOH
$BaTiO_{3-x}$[10]	Oxygen Vacancy	40 kHz, 110 W	132.4	None
MoS_2[11]	Vanadium-doped	68 kHz, 192 W	346.2	None
Bi_2S_3[12]	Sulfur vacancy	40 kHz, 200 W	2370	Na_2S and Na_2SO_3
MCC[13]	Vacancy	50 kHz, 300 W	84.47	MeOH
BiOCl-Bi_2S_3-40 This work	Heterojunction and Bismuth Vacancy	45 kHz, 120W	678.67	None

	45 kHz, 120W	2717.33	MeOH

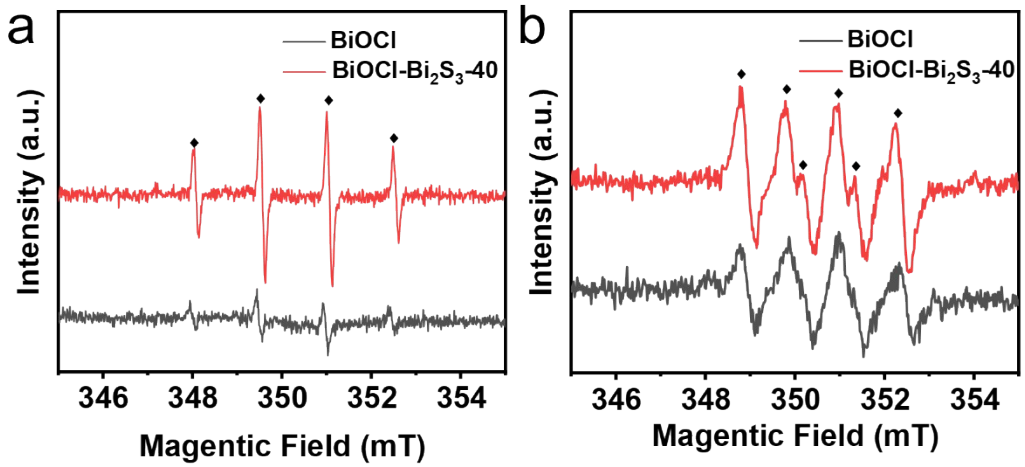

Fig. S8. EPR spectra of the samples for (a) DMPO-·OH, (b) DMPO-·O_2^-.

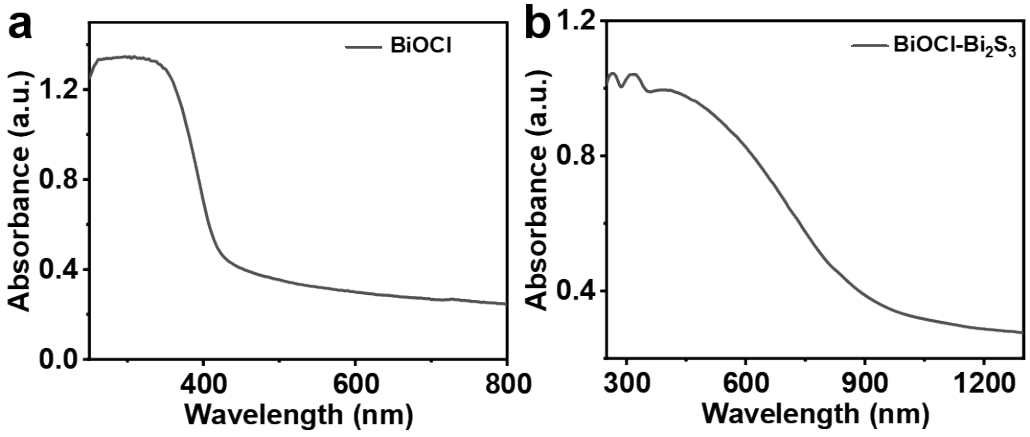

Fig. S9. UV-vis diffuse reflectance spectra (DRS) of (a) BiOCl, (b) and BiOCl-Bi_2S_3-40.

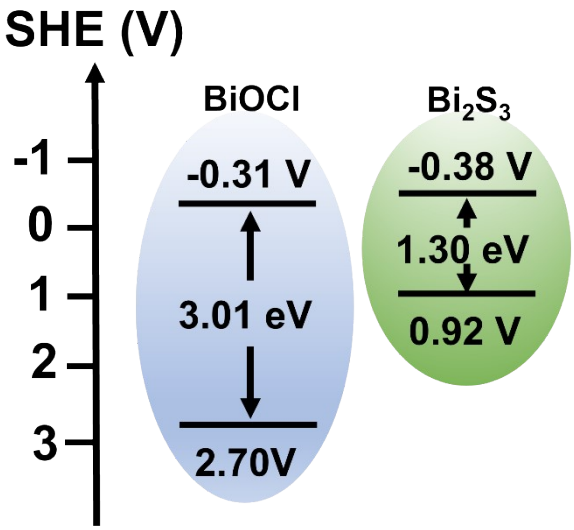

Fig. S10. Energy band diagram of BiOCl and Bi_2S_3.

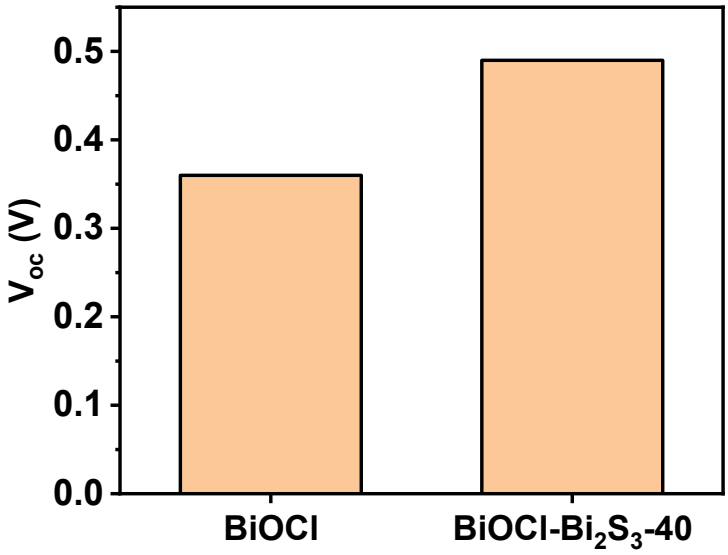

Fig. S11. The open-circuit voltage of BiOCl and BiOCl-Bi_2S_3-40.

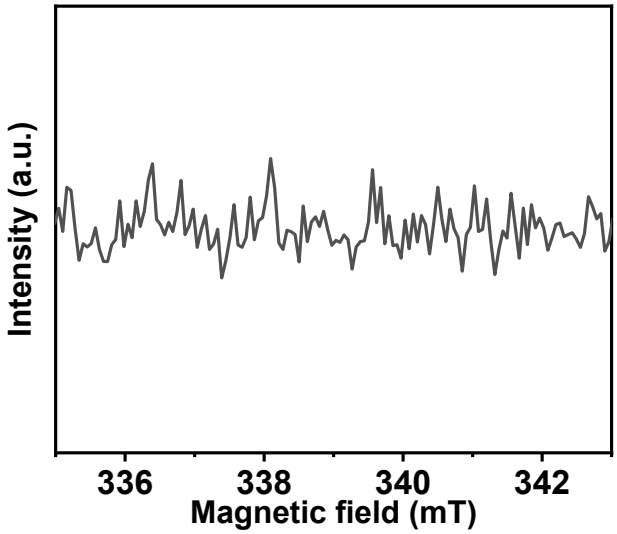

Fig. S12. EPR spectrum of 10% BiOCl- Bi_2S_3-N.

Reference.

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