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

Supplemental information

Enhanced Piezoelectricity and Spectral Absorption in Nd-doped Bismuth Titanate Hierarchical Microspheres for Efficient Piezo-photocatalytic H_2 Production and Pollutant Degradation

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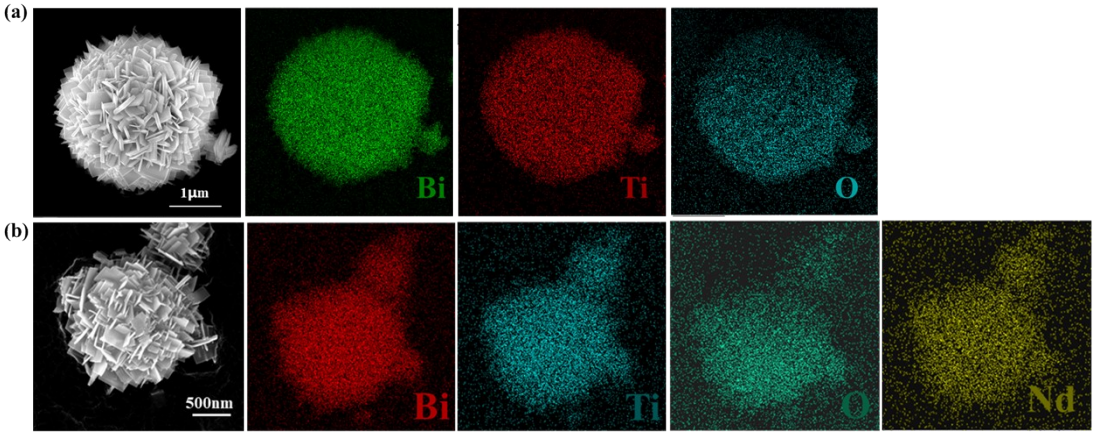

Fig. S1. EDS mapping images of (a) BIT (b)BIT-Nd powders.

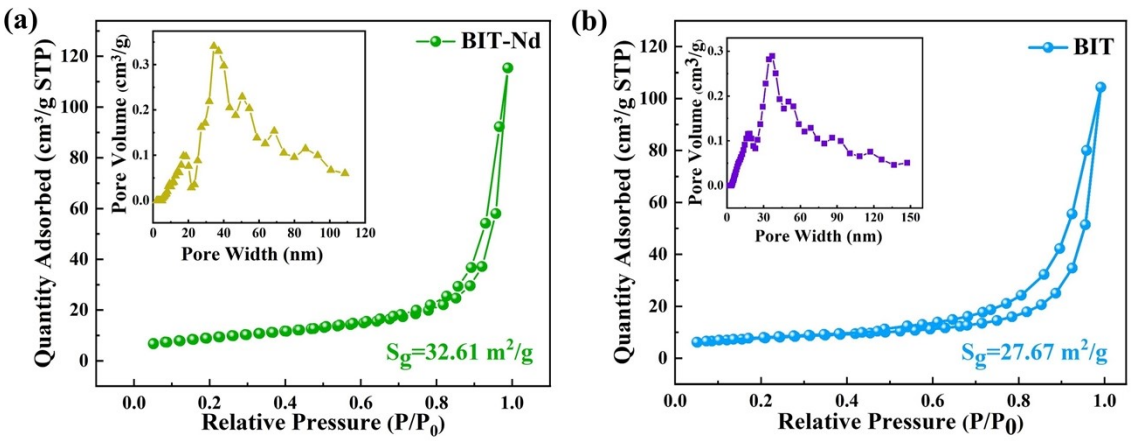

Fig. S2. N_2 sorption isotherm and pore size distribution curve of BIT-Nd and BIT powders.

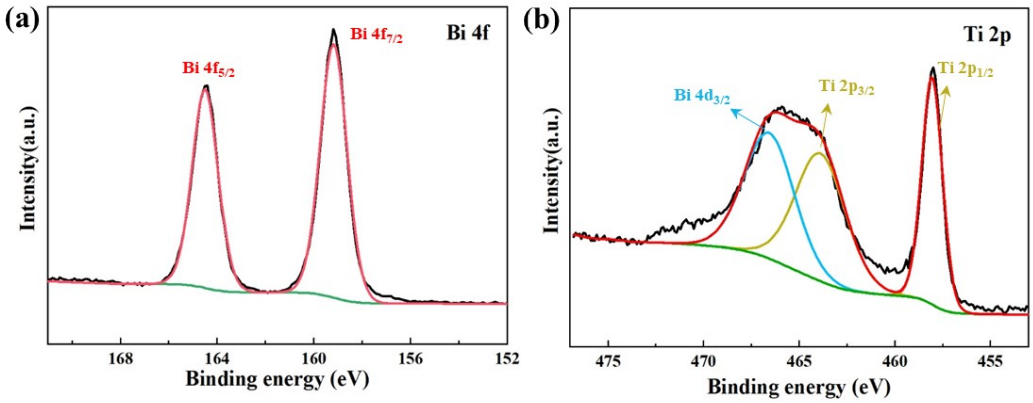

Fig. S3. The high-resolution XPS spectra of (a) Bi 4f and (b) Ti 2p of the BIT-Nd powders.

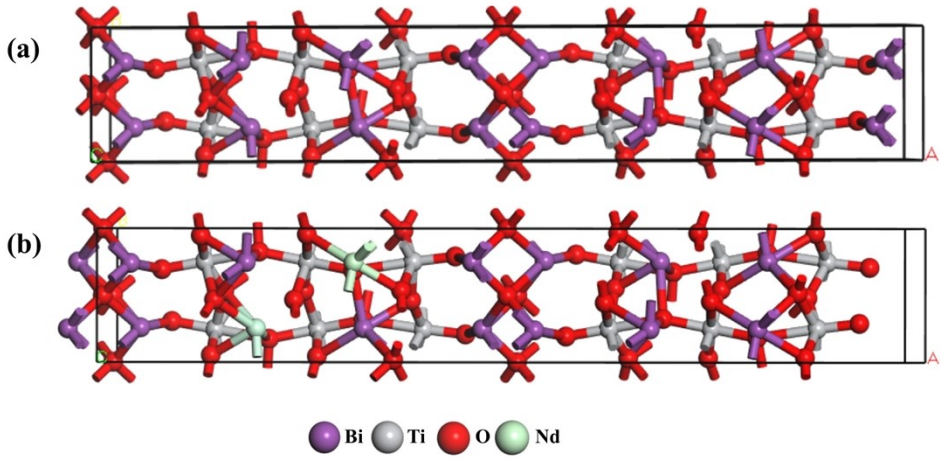

Fig. S4 Optimized structures of (a) BIT and (b) BIT-Nd.

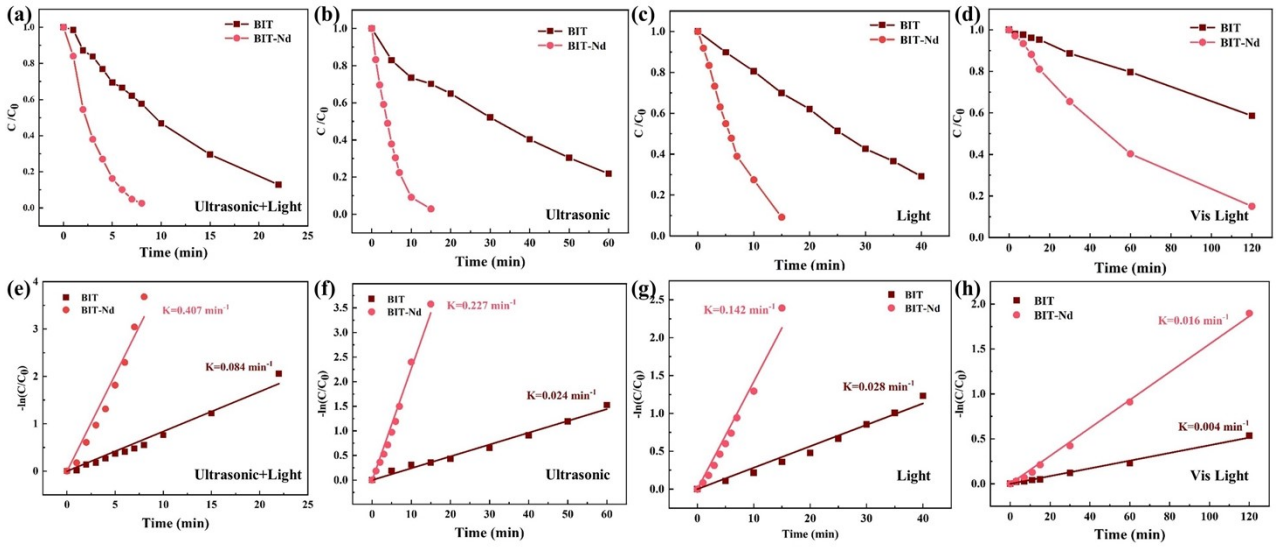

Fig. S5 C/C_o and ln (C_0/C) $-t$ curve of BIT and BIT-Nd for degradation of 10 mg/L RhB under Vis Light (420-1100 nm), Light (190-1100 nm), Ultrasonic and combined Ultrasonic and Light excitation.

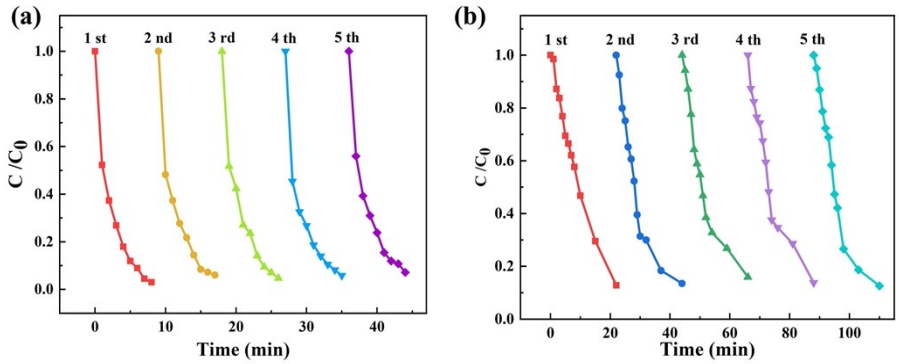

Fig. S6 Recycling of BIT-Nd and BIT powders during 5 piezo-photocatalytic cycles.

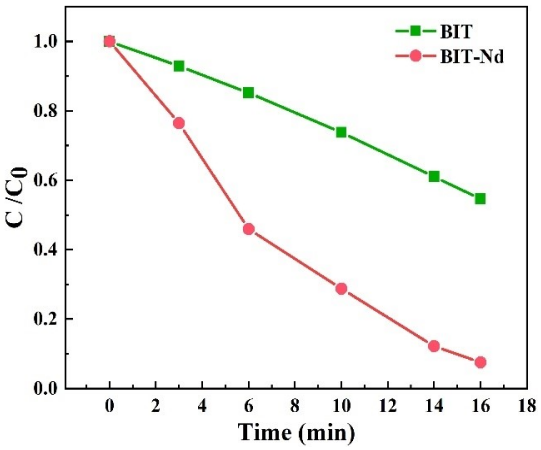

Fig. S7 Piezo-photocatalytic performance of BIT and BIT-Nd under ultrasonic and light for the degradation of 40 mg/L RhB

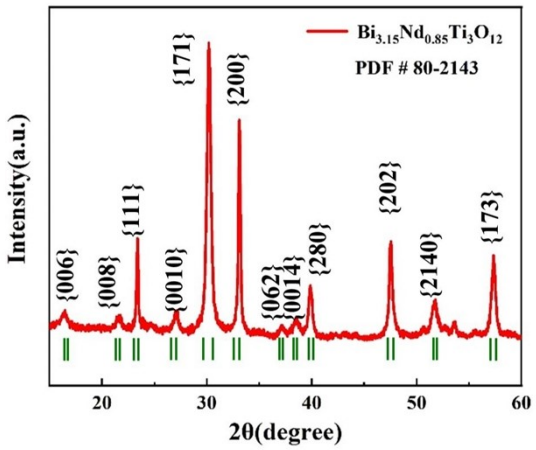

Fig. S8 XRD pattern of BIT-Nd powders after six cycles of H_2 production

Table S1 Comprehensive comparison of previously reported piezo-photocatalysts and this work for degradation of RhB.

	Catalyst	C (Catalyst)	Dye	C_0 (Dye)	Condition	$k\times10^{-3}$ (min^{-1})	Ref.
1	$Bi_{0.5}Na_{0.5}TiO_3$ nanospheres	0.5 g/L	RhB	10 mg/L	Ultrasonic:40 kHz,110 W; Light: 200 mW cm^{-2}	~61	[1]
2	$Bi_{0.5}Na_{0.5}TiO_3$ @TiO_2	0.5 g/L	RhB	10 mg/L	Ultrasonic:40 kHz,100 W; Light: visible light 300 W	27.9	[2]

3	$Na_{0.5}K_{0.5}NbO_3$-6$LiNbO_3$	4 g/L	RhB	5 mg/L	Ultrasonic	25.16	[3]
4	$BaTiO_3$@TiO_2 microflowers	0.5 g/L	RhB	10 mg/L	Ultrasonic:45 kHz,200 W; Light: visible light 300 W	274	[4]
5	CBN particles	0.5 g/L	RhB	10 mg/L	Ultrasonic:45 kHz,200 W; Light: visible light 300 W	131	[5]
6	$Bi_{0.5}Na_{0.5}TiO_3$@ $BiVO_4$	1.0 g/L	RhB	5 mg/L	Ultrasonic:45 kHz,200W; Light: 300 W	110	[6]
7	BTCNO/5%-CN	0.6g/L	RhB	10 mg/L	Ultrasonic:45 kHz; Light: 300 W	48.9	[7]
8	BNT rods	1g/L	RhB	5 mg/ L	Ultrasonic:28 kHz,200w Light: 300w	~94	[8]
9	hexagonal ZnO crystals	1g/L	RhB	10 mg/L	Ultrasonic:40 kHz,300w Light: 300w	23.75	[9]
10	$BaTiO_3$@ReS_2	0.4g/L	RhB	10 mg/L	Ultrasonic:40 kHz,100w Light: UV-vis	133	[10]
11	0.02La-$BaTiO_3$	1g/L	RhB	5 mg/L	Ultrasonic:40 kHz,100w Light: 300 W	274	[11]
12	$Bi_4Ti_3O_{12}$ nanoplates	1g/L	RhB	5 mg/L	Ultrasonic:300 W, 40 kHz Light: 300W	141.4	[12]
13	$BaTiO_3$-OV	1.0g/L	RhB	10 mg/L	Ultrasonic:50 kHz,100 W	25.3	[13]
14	5%-Cl-ZnO NRs	0.2g/L	RhB	10 mg/L	Ultrasonic:40 kHz,100 W Light: 300w	23.2	[14]
15	BIT-Nd	1g/L	RhB	10mg/L	Ultrasonic:45 kHz,200 W; Light: 300 W	407	This Work

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