Electronic Supplementary Material (ESI) for RSC Advances.

Piezo-photocatalytic Properties of $BaTiO_3/CeO_2$ Nanoparticles with Heterogeneous Structure Synthesized by Gel-assisted Hydrothermal Method

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Table S1 A comparison of some piezo-photocatalysts in applications of pollutant degradation.

Catalyst	Morphology	E_g	Amount of catalyst	Pollutant	Degration rate [Rate(%)-time]	Catalytic conditions	Ref.
BiOBr/BTO	Nanoplates ~ 380 nm	———	10 mg	MO [50 ml, 10 mg·L^{-1}]	100% -30 min	Xe lamp [300 W] + ultrasonic [—, 40 kHz]	[1]
BiVO4:I/BTO-Ag	Rice-like ——	———	20 mg	RhB [50 ml, 10 mg·L^{-1}]	55% - 15 min	Xe lamp [300 W] + ultrasonic [150 W, 40 kHz]	[2]
BT/Ag_2O	Nanocubes ~70 nm	3.27 eV	20 mg	RhB [20 ml, 15 mg·L^{-1}]	100%-1.5 h	Mercury lamp [30.4 mW·cm^{-2}] + ultrasonic [50 W, 27 kHz]	[3]
BT@TiO_2	Nanowires > 2μm	3.19 eV	50 mg	RhB [100 ml, 30 mg·L^{-1}]	99.5% -75 min	Xe lamp [300 W] + ultrasonic [120 W, 45 kHz]	[4]
(Ag-Ag_2S)/$BaTiO_3$	Nanoparticles ~ 100 nm	———	50 mg	MO [50 ml, 0.01 mM]	90% - 30 min	Xe lamp [300 W] + ultrasonic [—, —]	[5]
1mAg-$BaTiO_3$	Nanoparticles ~ 100 nm	———	50 mg	RhB [50 ml, 0.01mM]	83% - 75 min	Xe lamp [300 W] + ultrasonic [—, —]	[6]
$BaTiO_3$/TiO_2	Nanofibers ——	3.13 eV	100 mg	RhB [—, —]	100% -60 min	Hg lamp [250 W] + ultrasonic [300 W, 40 kHz]	[7]
BTO/STO-10	Nanofibers ——	3.10 eV	100 mg	RhB [100 ml, 1 mg·L^{-1}]	97.8% - 30 min	LED UV lamp [30 W] + ultrasonic [300 W, 40 kHz]	[8]
BT@C-0.001M	Nanoparticles ~ 500 nm	3.16 eV	100 mg	RhB [100 ml, 10 mg/L]	100%-100 min	Xe lamp [300 W] + ultrasonic [120 W, 40 kHz]	[9]
$BaTiO_3$/CeO_2 [Ti/Ce = 0.875:0.125]	Nanoparticles ~ 300nm	3.21 eV	100 mg	RhB [100 ml, 10 mg/L]	~70% -120min	Xe lamp [300 W] + ultrasonic [120 W, 40 kHz]	This work

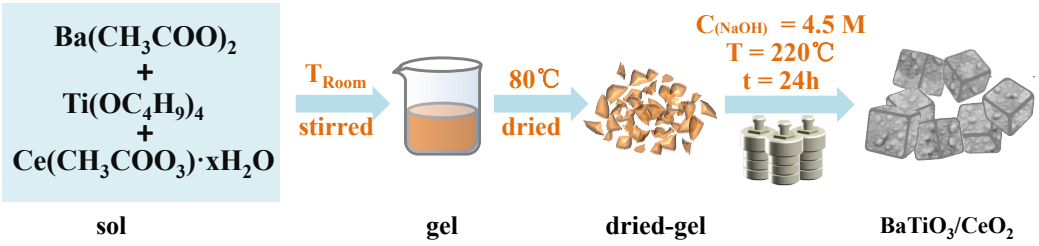

Fig. S1 Schematic of BT_xCe_y nanoparticles synthesis route

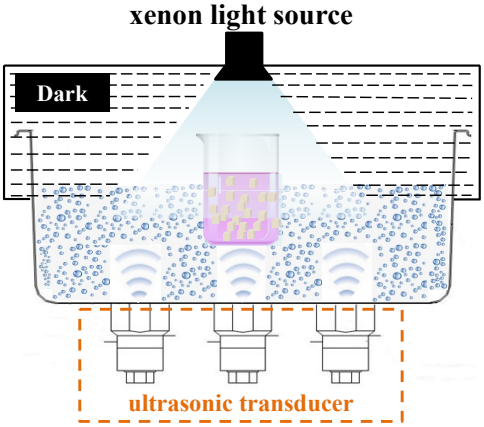

Fig. S2 Device diagram of the Piezo-photocatalytic test

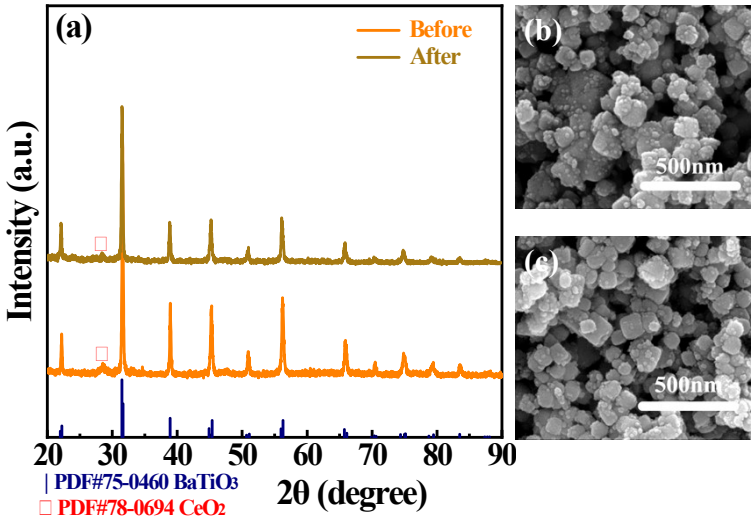

Fig. S3 XRD patterns (a), SEM images of $BaTiO_3/CeO_2$-3 before (b) and after (c) piezo-photocatalytic cycles (3 times)

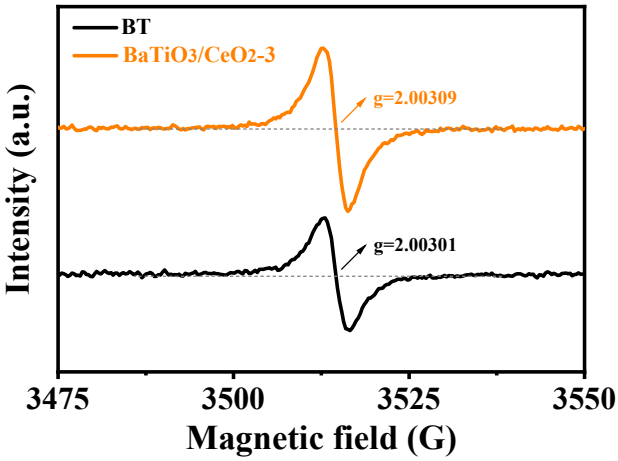

Fig. S4 EPR spectra of BT and $BaTiO_3/CeO_2$-3 nanoparticles

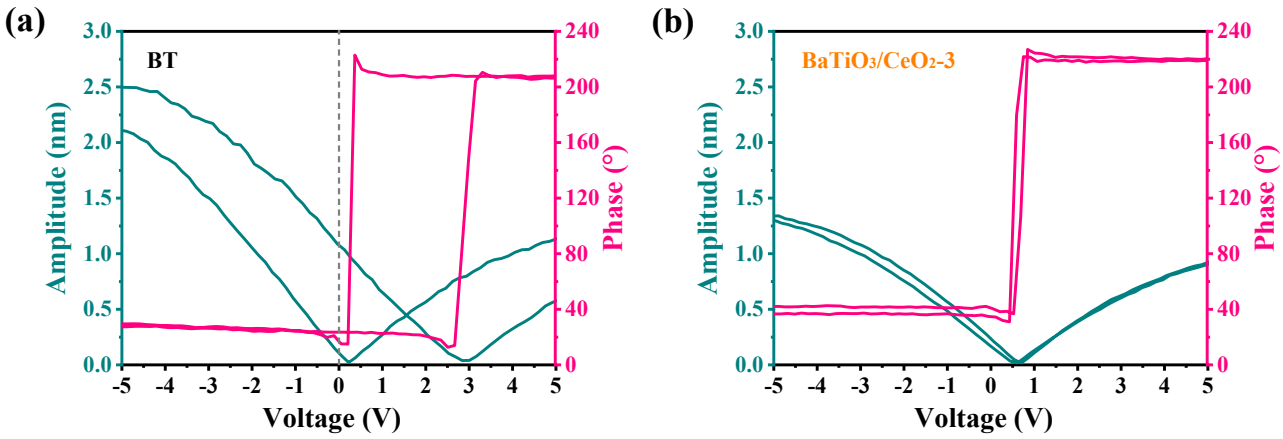

Fig. S5 Piezoelectric characterization of BT and $BaTiO_3/CeO_2$-3 by PFM. Piezoelectric response phase curve (pink color) and amplitude curve (cyan color) of BT (a) and $BaTiO_3/CeO_2$-3 (b) with voltage from +5 V to -5 V.

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