Supporting Information for

Few-Layer MoS_2 Nanosheet-Coated $KNbO_3$ Nanowire Heterostructures: Piezo-Photocatalytic Effect Enhanced Hydrogen Production and Organic Pollutant Degradation

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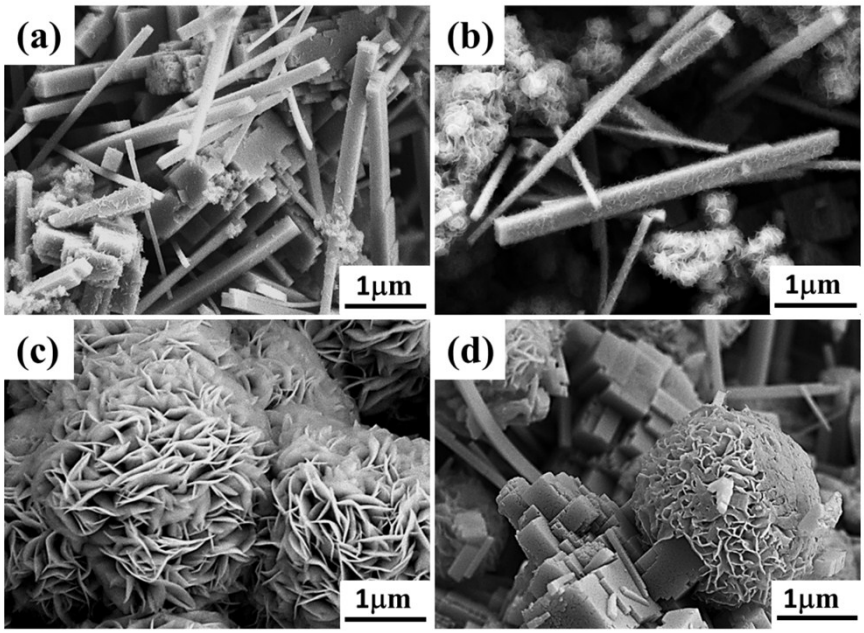

Fig. S1. SEM images of (a) KN/MS-10, (b) KN/MS-50, (c) MoS_2 and (d) KN/MS-50 without using oxalic acid as solvent.

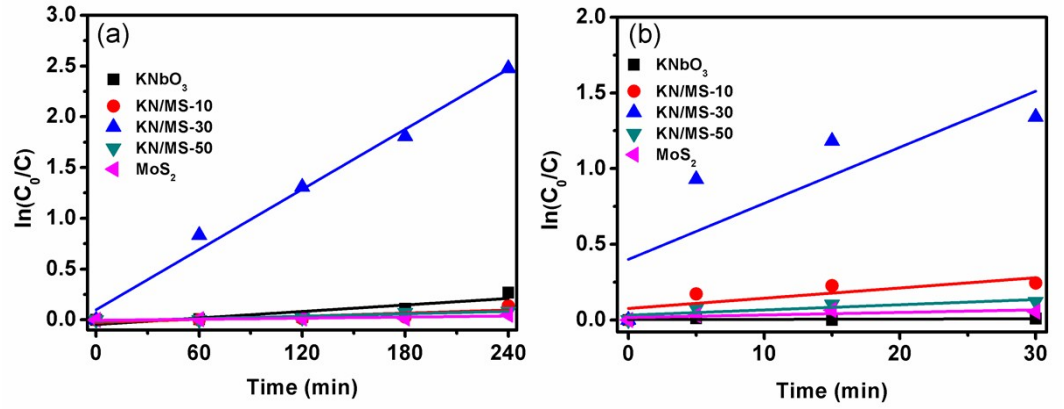

Fig. S2. The degradation reaction kinetics of RhB solution over different KN/MS particulate suspensions (a) under simulated solar light irradiation, (b) under both ultrasonic vibrations and simulated solar light irradiation for 30min.

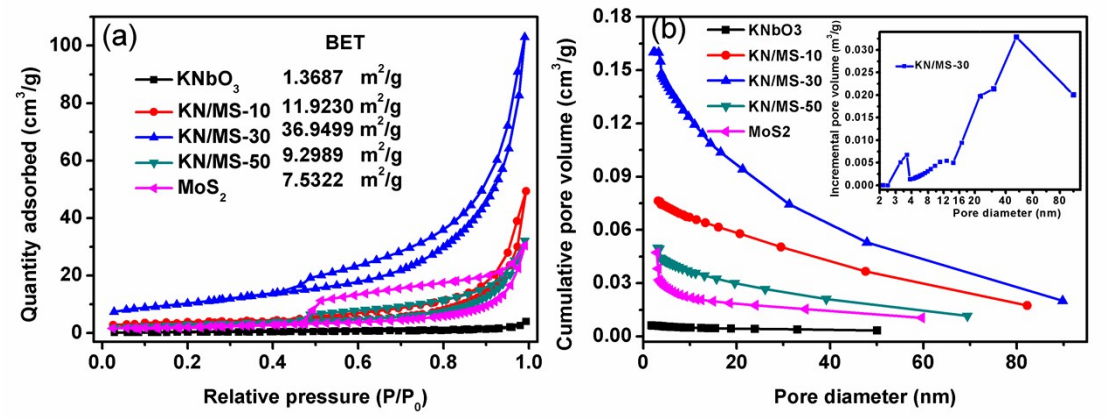

Fig. S3. (a) N_2 sorption isotherms and (b) cumulative pore-size distributions of all samples (inset shows the incremental pore volume of KN/MS-30).

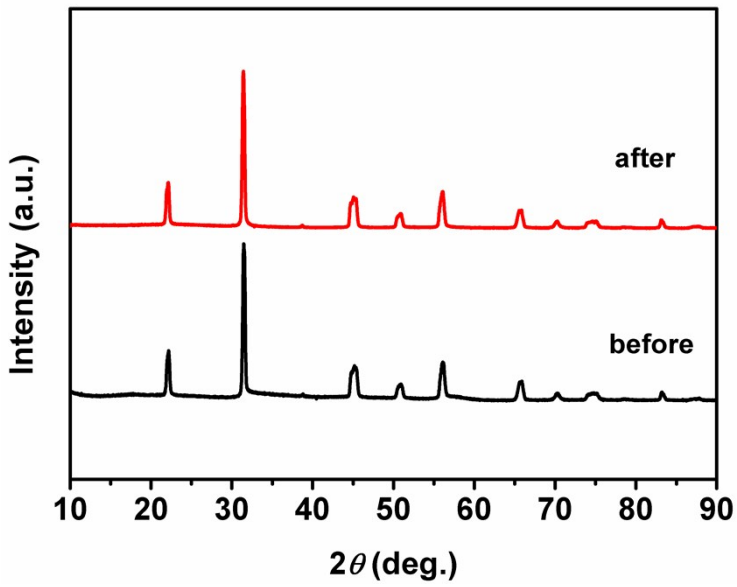

Fig. S4. XRD patterns of KN/MS-30 before and after ultrasonic vibrations.

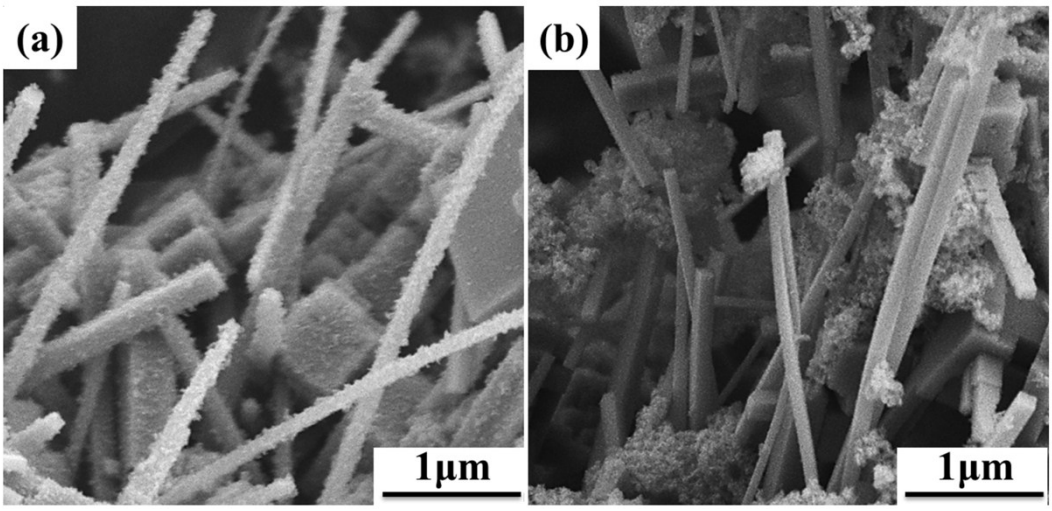

Fig. S5. SEM images of KN/MS-30 before and after piezo-/photocatalytic reaction.

Table S1. Lattice parameters of MoS_2 obtained for different samples. (The peak offset marked as "Δ" was compared to standard PDF 37-1492 of MoS_2 and the interplanar crystal spacing is marked as d.)

Sample	Method	MoS_2		
		$2\theta_{(002)}$	$2\theta_{(100)}$	$2\theta_{(110)}$
MoS_2	**PDF 37-1492**	14.378° (d = 0.615 nm)	32.676° (d = 0.274 nm)	58.334° (d = 0.158 nm)
Pure MoS_2	**XRD**	14.062° (Δ = –0.316°) (d = 0.629 nm)	33.130° (Δ = +0.454°) (d = 0.270 nm)	58.580° (Δ = +0.246°) (d = 0.157
KN/MS-50	**XRD**	13.315° (Δ = –1.063°) (d = 0.664 nm)	32.852° (Δ = –0.656°) (d = 0.272 nm)	57.706° (Δ = –0.628°) (d = 0.159
KN/MS-30	**SAED**	0.660 nm	d=0.279 nm	d=0.158 nm

Table S2. Radiative fluorescence lifetimes and their relative percentages of photoexcited charge carriers for pure $KNbO_3$ and KN/MS-30.

Sample	τ_1 (ns) – Rel %	τ_2 (ns) – Rel %	τ_{ave} (ns)	χ^2
$KNbO_3$	0.11 (100%)	-	0.11	1.058
KN/MS-30	0.16 (87.5%)	1.29 (12.5%)	0.30	1.175

Table S3. Comparison of catalytic properties for KN/MS heterostructures and the reported works with different $KNbO_3$ based materials systems.

Photocatalyst	Dosage (mg)	Degradation Product	Experiment condition	Degradation rate ($\times10^{-3}$ min^{-1})	Ref.
$KNbO_3$/MoS_2	15	RhB (10.0 mg/L)	Simulated Solar Light and Ultrasonic Vibration	37.0	This work
$KNbO_3$ nanorods	20	RhB (20.0 mg/L)	UV Light	3.0	[1]
$KNbO_3$ nanocubes				2.0	
$KNbO_3$ microcubes				1.3	
N-$KNbO_3$ nanocubes			Visible Light	1.5	
$KNbO_3$ nanowires	50	RhB (0.01 mM, 4.8 mg/L)	UV Light	2.5	[2]
$KNbO_3$ nanorods				1.1	
Commercial $KNbO_3$				1.0	
$KNbO_3$ nanowires +8.0wt% Au				16.2	
$KNbO_3$ nanosheets	50	RhB (10.0 mg/L)	Simulated Solar Light and Ultrasonic Vibration	22.0	[3]
$KNbO_3$ nanocubes				16.0	
Er^{3+}:$Y_3Al_5O_{12}$/$KNbO_3$ (mass ratios 0.30:1.00)	100	Ketamine (10.0 mg/L)	Air Atmosphere Ultrasonic Irradiation	3.9	[4]
Carbon quantum dots/$KNbO_3$ (molar ratios 1.5/0.5)	50	Violet Dye (10.0 mg/L)	Visible Light	1.2	[5]
1.7 wt% Ag/$KNbO_3$	50	RhB (8×10^{-6} M, 3.8 mg/L)	Visible Light	4.5	[6]
			UV Light	55.38	

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