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Supplementary information

How does the Zn-precursor nature impact on carrier transfer into $ZnO/Zn\text{-}TiO_2$ nanostructures? organic vs. inorganic anions

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1. Identification of main vibration modes in layer basic zinc salts

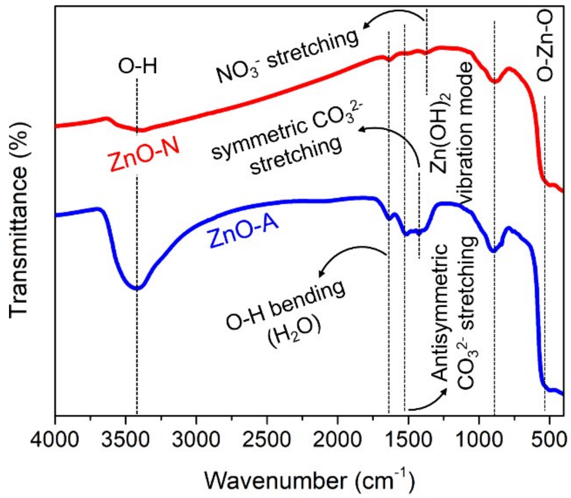

Figure S1. FT-IR spectra of ZnO-N and ZnO-A nanorods based powders.

2. morphology of a TiO_2 thin film

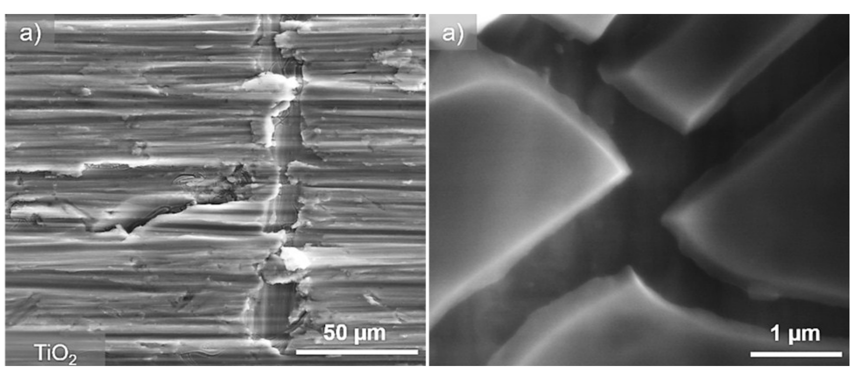

Figure S2. FESEM images of TiO_2 film surface at (a) low and (b) high magnifications.

3. Photochemical properties of TiO_2, N-ZT and A-ZT composite films

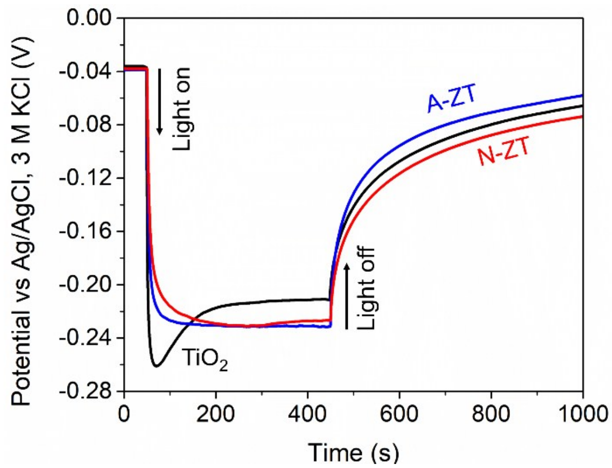

Figure S3. Open-circuit photopotential curves for TiO_2 film, N-ZT and A-ZT heterostructure based films.

4. Stabilized photocurrent of ZnO nanorods

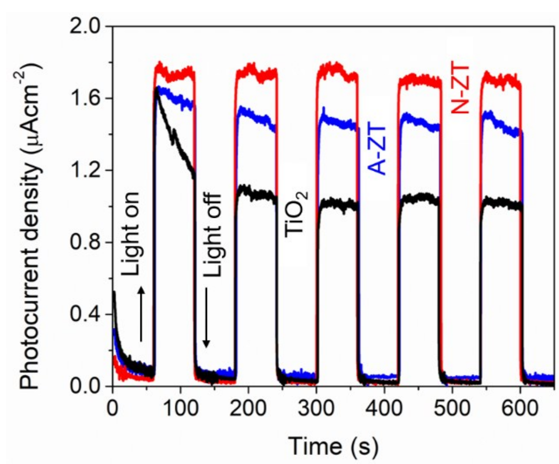

Figure S4. Chopped light transient photocurrent measurements for TiO_2 film, N-ZT and A-ZT heterostructure based films at 0.5 V *vs.* Ag/AgCl. Electrolyte solution: 0.1 M $HClO_4$ (pH 1); illumination source: halide lamp (60 mW cm^{-2}).

5. XPS quantification of ZnO nanorods powders, N-ZT and A-ZT composite films

Table S1. Percentage of species identified during XPS analysis of ZnO nanorods-based powders.

Sample	Chemical environment (at. %)			
	Oxygen species	Carbon species	Zn-O	Zn^{+}
ZnO-N	34.75	16.55	33.02	15.68
ZnO-A	33.41	26.75	26.37	13.47

Table S2. Percentage of species identified during XPS analysis of composite films.

Sample	Chemical environment (at. %)					
	Oxygen species	Carbon species	Zn-O	Zn-O-Ti	Ti^{3+}	Ti^{4+}
N-ZT	40.87	43.85	0.40	0.91	1.11	12.86
A-ZT	28.15	63.01	0.85	0.79	0.25	6.95