Electronic Supplementary Material (ESI) for New Journal of Chemistry

Improving Photocatalytic Reduction of 4-nitrophenol over ZrO_2-TiO_2 by Synergistic Interaction between Methanol and Sulfite Ions

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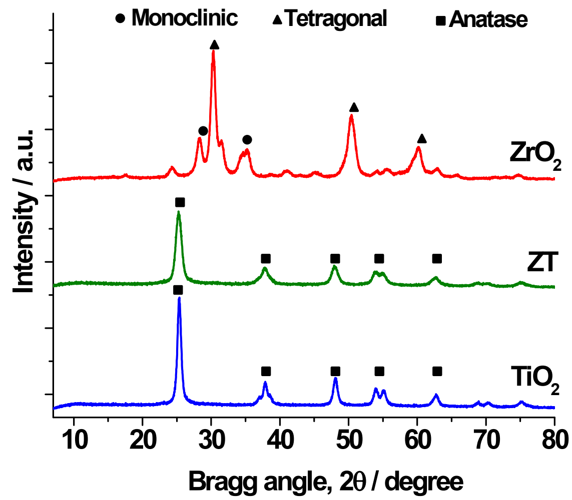

Fig. S1. XRD diffraction patterns of TiO_2, ZrO_2 and ZT photocatalysts.

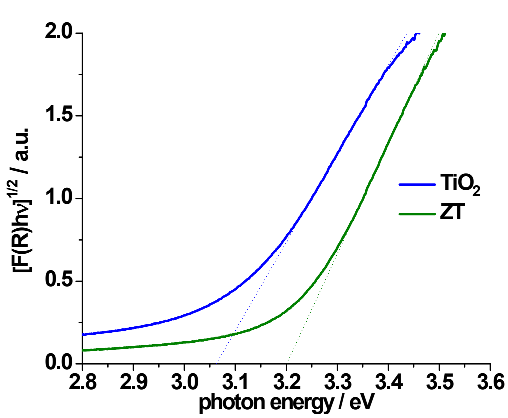

Fig. S2. Plot of the modified Kubelka-Munk function used to estimate the band gap for TiO_2 and ZT photocatalysts.

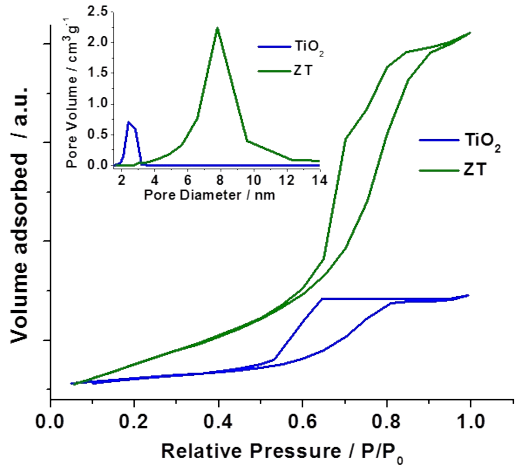

Fig. S3. N_2 gas adsorption–desorption isotherm of TiO_2 and ZT photocatalysts. The insert corresponds to pore size distribution for TiO_2 and ZT photocatalysts.

Table S1. *Structural, textural and optical properties of the calcined materials.*

Materials	$D_{(101)}$-* nm	S_{BET}‡ m^2/g	E_g† eV
TiO_2	12.7	51	3.1
ZT	8.8	147	3.2

* Estimated from FWHM from the main peak in XRD patterns shown in Figure 1S using the Scherrer equation.

‡ Estimated by BET N_2 adsorption method.

† Estimated diffuse reflectance spectra.

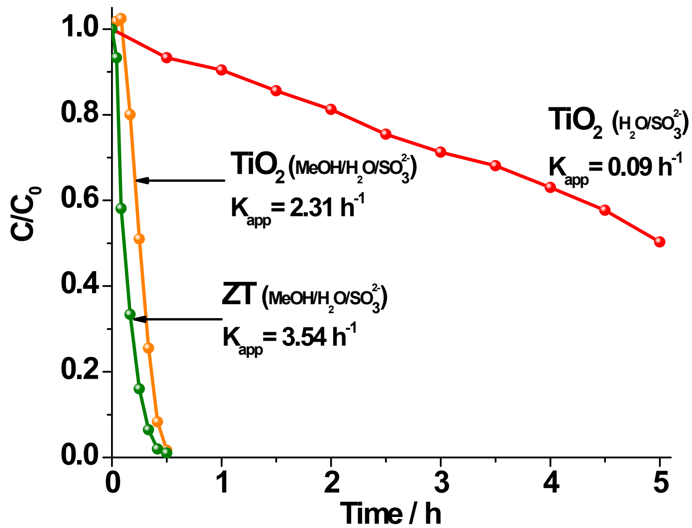

Fig S4. Comparison of 4-nitrophenol photoreduction in $MeOH/H_2O/SO_3^{2-}$ and H_2O/SO_3^{2-} electrolytes employing TiO_2 and 4-nitrophenol photoreduction in $MeOH/H_2O/SO_3^{2-}$ electrolyte using ZT photocatalyst.

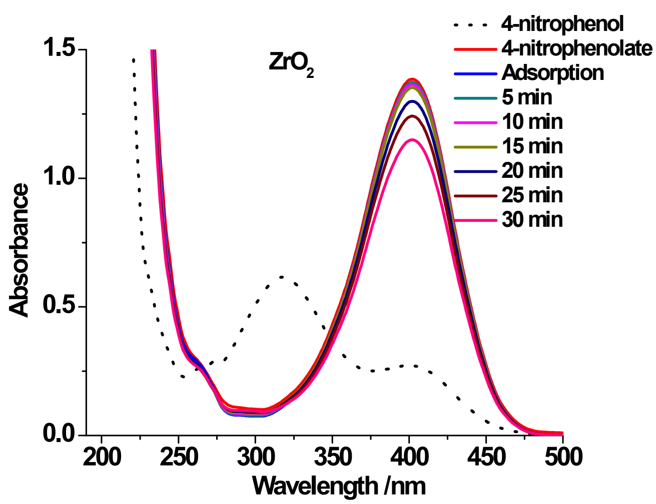

Fig S5. UV-Vis spectra of 4-nitrophenol photoreduction with pristine ZrO_2

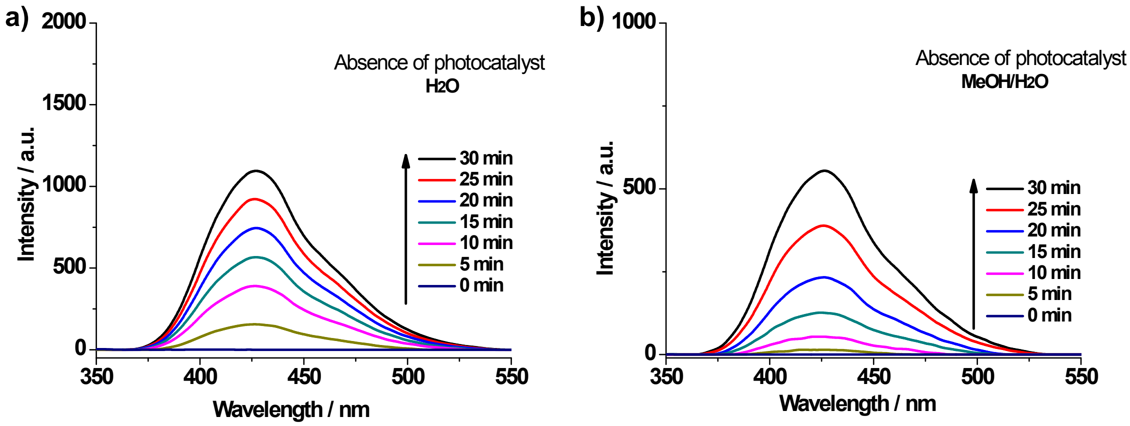

Fig. S6. Fluorescence spectra of terephthalic acid solutions without photocatalyst under UV light in two electrolytes: a) H_2O and b) MeOH/H_2O