

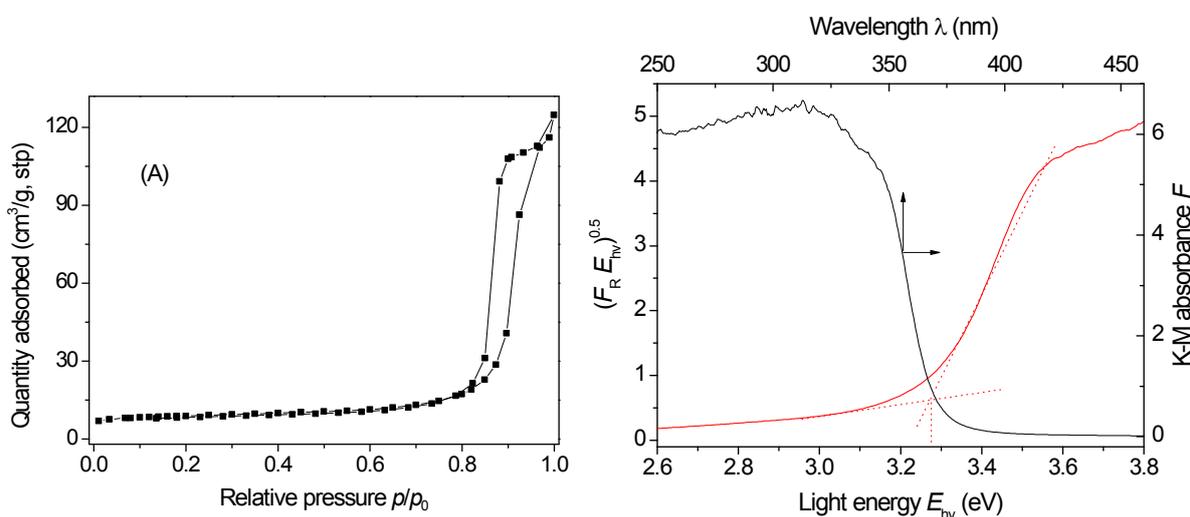
### Electronic Supplementary Information

## Brookite TiO<sub>2</sub> photocatalyzed degradation of phenol in presence of phosphate, fluoride, sulfate and borate anions

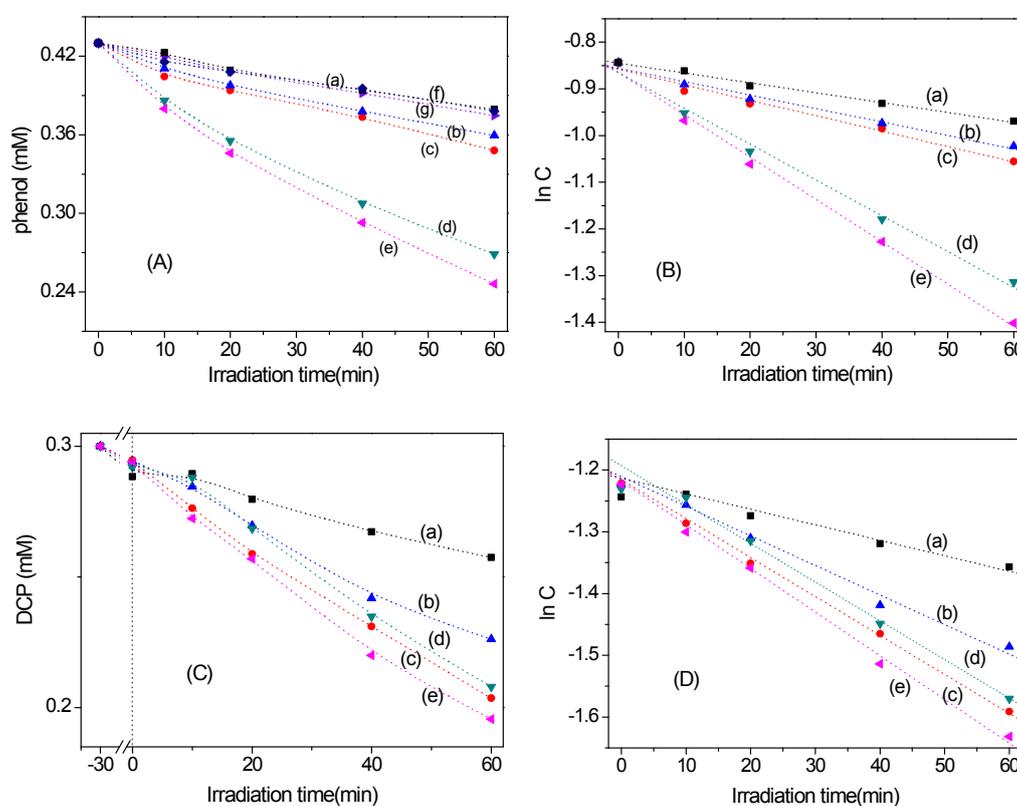
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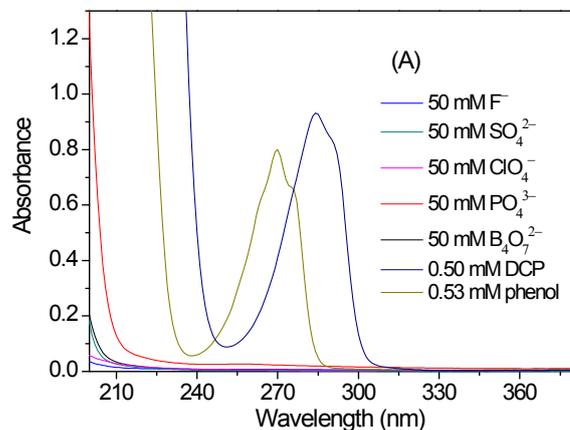
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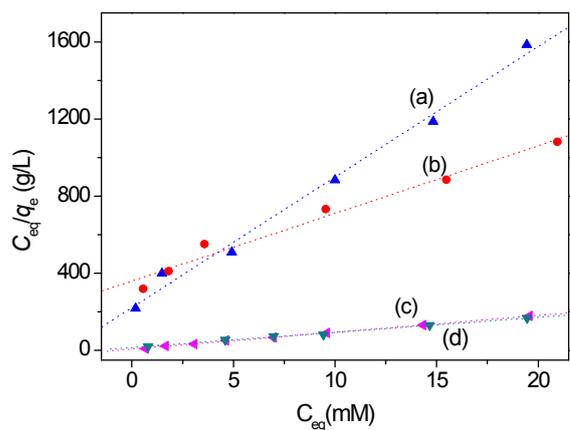
**Fig. S1.** (A) N<sub>2</sub> adsorption–desorption isotherms, and (B) UV–vis diffuse reflectance spectra and Tauc plot for the indirect transition of TiO<sub>2</sub> sample. The Kubelka–Munk (K–M) absorbance ( $F_R$ ) is calculated by using the equation,  $F_R = (1 - R)^2/2R$ , where  $R$  is the solid reflectance.



**Fig. S2.** Time profiles and kinetic fitting for the brookite-photocatalyzed degradation of phenol (A, B) and DCP (C, D), measured (a) without anions, and with 10 mM of (b) SO<sub>4</sub><sup>2-</sup>, (c) B<sub>4</sub>O<sub>7</sub><sup>2-</sup>, (d) F<sup>-</sup>, (e) PO<sub>4</sub><sup>3-</sup>, (f) HCO<sub>3</sub><sup>-</sup>, and (g) ClO<sub>4</sub><sup>-</sup>. Experiments were performed in an aerated aqueous suspension at pH 5.0.



**Fig. S3.** Absorption spectra of phenol, DCP, and inorganic anions in aqueous solution at pH 7.0



**Fig. S4.** Date fitting for the adsorption isotherms of anions on  $\text{TiO}_2$ , where  $C_{eq}$  is the equilibrium concentration of anions in aqueous solution,  $q_e$  is the amount of anions adsorbed at  $C_{eq}$ ,  $q_{max}$  is the maximum amount of anions adsorption, and  $K$  is adsorption constant. These data correspond to Fig. 4B in the text.