Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Selective and efficient catalytic and photocatalytic oxidation of diphenyl sulphide to sulfoxide and sulfone: the role of hydrogen peroxide and TiO_2 polymorph

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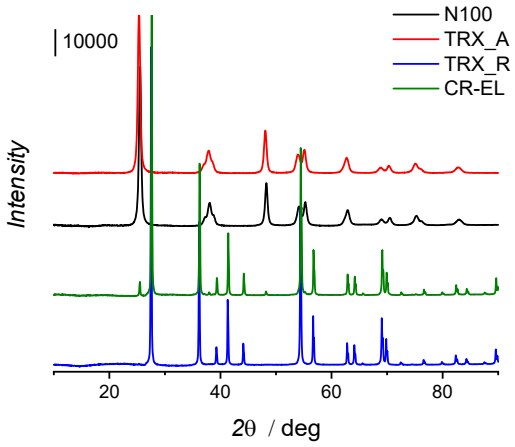

Figure S1. XRD patterns of studied materials.

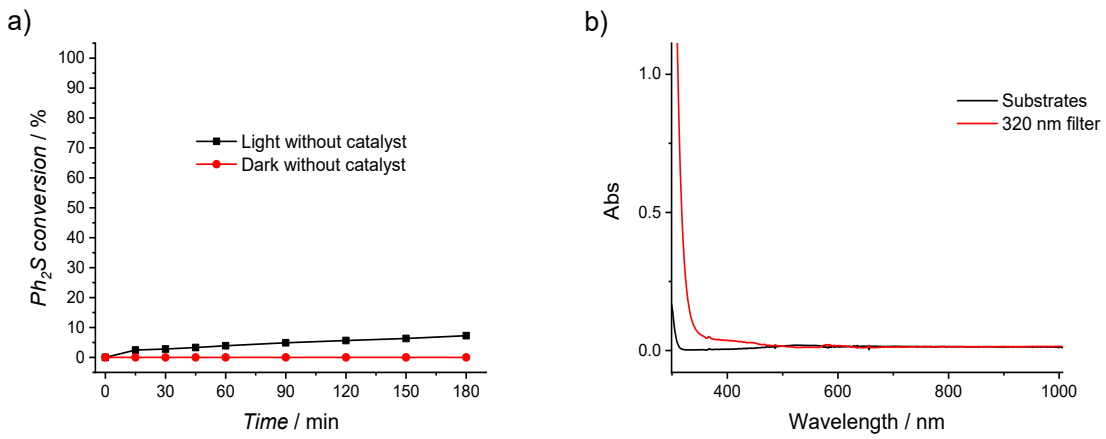

Figure S2. Conversion of Ph_2S in dark and upon irradiation, reaction mixtures without photocatalyst (a), absorption spectra of substrates (solution of diphenyl sulfoxide, hydrogen peroxide, and bromobenzene in acetonitrile) and 320 nm filter (b).

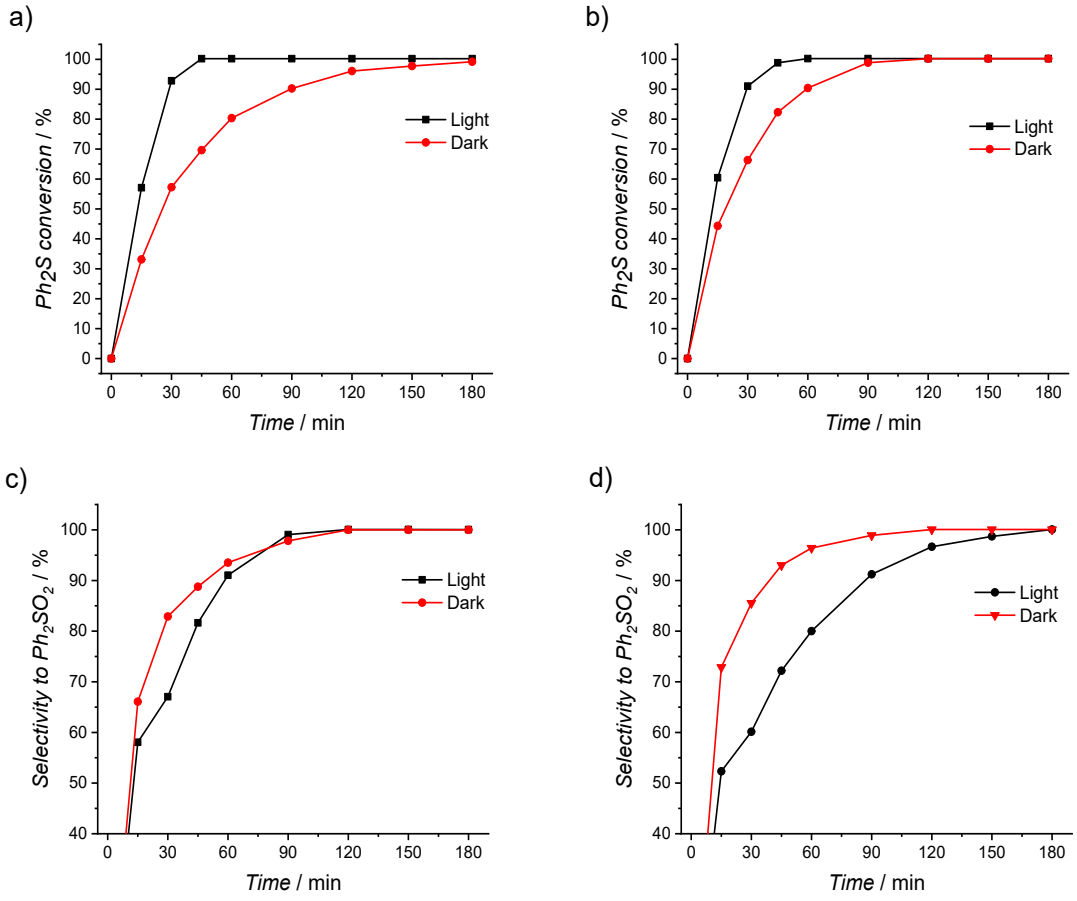

Figure S3. Conversion of Ph_2S at anatase materials: a) N100, b) TRX_A. Selectivity to the main product generation (Ph_2SO_2) for: c) N100, d) TRX_A. Data for dark and irradiation conditions.

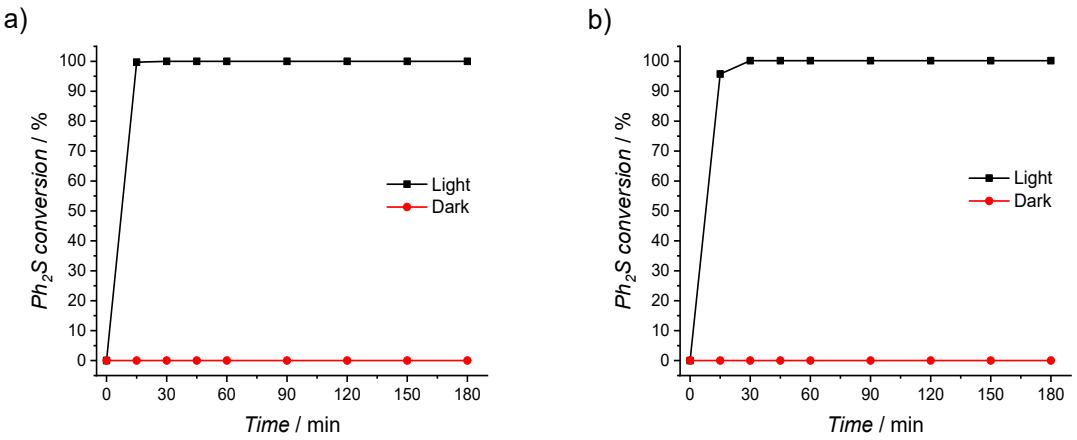

Figure S4. Conversion of Ph_2S in dark and upon irradiation at rutile materials: a) TRX_R, b) CR-EL.

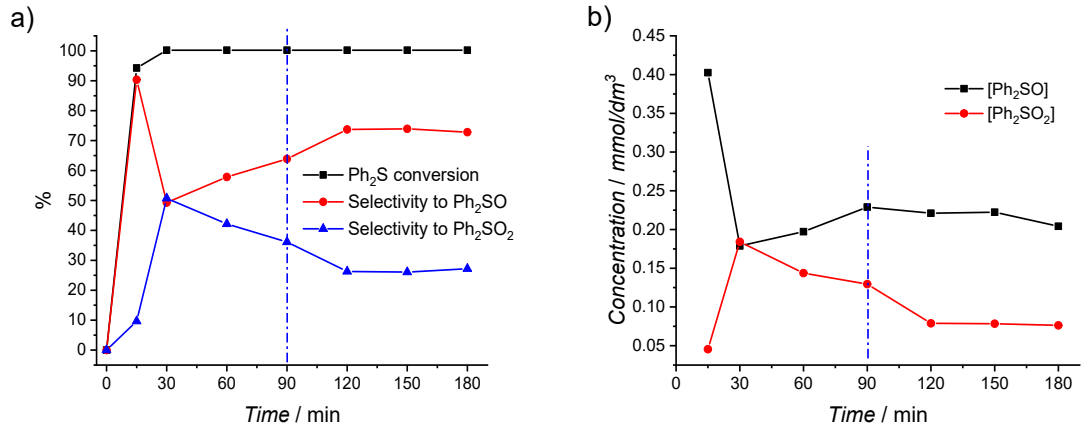

Figure S5. Ph_2S conversion and selectivity to Ph_2SO and Ph_2SO_2 (a), Ph_2SO and Ph_2SO_2 concentration changes during photocatalytic reaction at rutile CR-EL materials (b). After 90 minutes of reaction new portion of H_2O_2 was added.

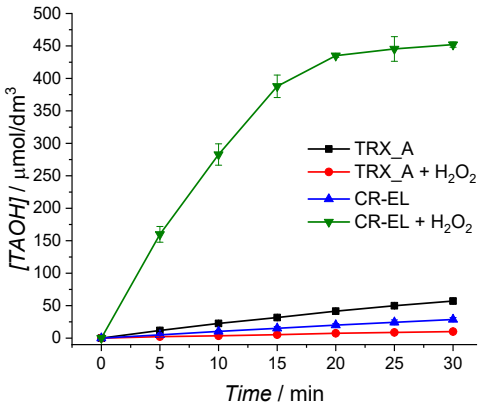

Figure S6. Photogeneration of TAOH in the process of photocatalytic oxidation of TA in the presence of TRX_A and CR-EL materials, with and without hydrogen peroxide (2 mmol/dm^3).

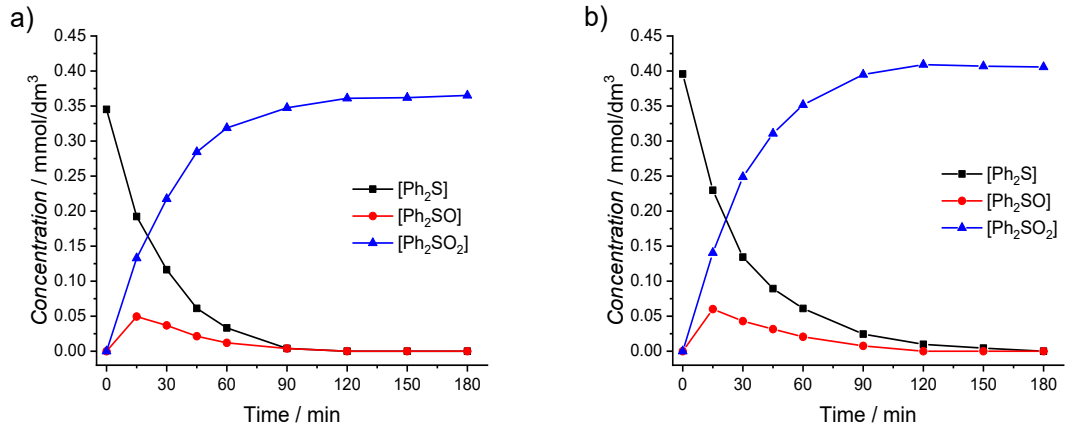

Figure S7. Concentration of reactants during Ph_2S oxidation at anatase TRX_A materials in the dark, under a) ambient and b) argon-saturated conditions.

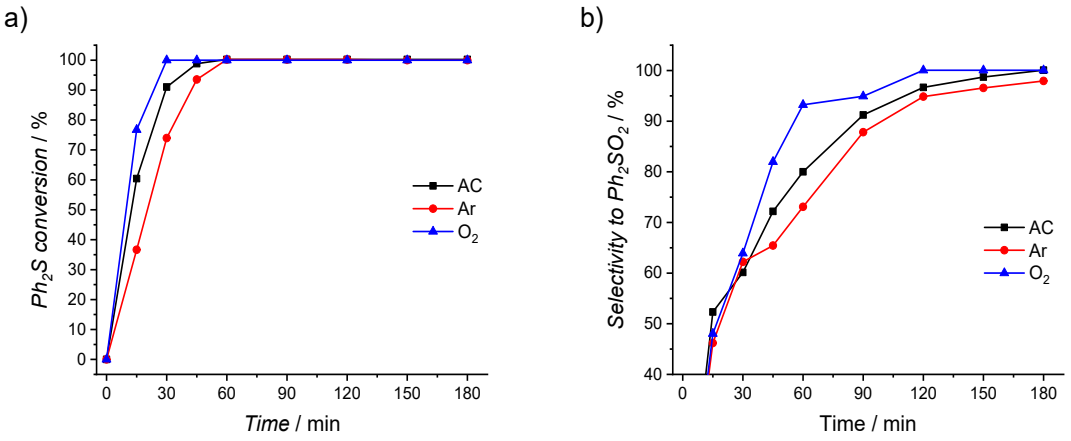

Figure S8. Influence of reaction condition on the conversion of Ph_2S (a), and selectivity to Ph_2SO_2 (b) at anatase TRX_A material. AC – ambient conditions, Ar – under argon atmosphere, O_2 – under oxygen atmosphere. All experiments were conducted upon irradiation.

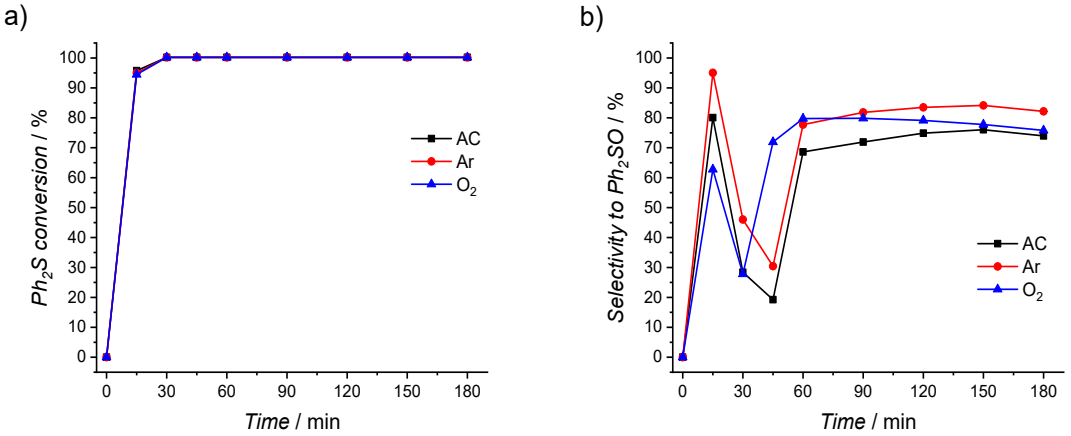

Figure S9. Influence of reaction conditions on the conversion of Ph_2S (a), and selectivity to Ph_2SO (b) at rutile CR-EL material. AC – ambient condition, Ar – under argon atmosphere, O_2 – under oxygen atmosphere. All experiments were conducted upon irradiation.

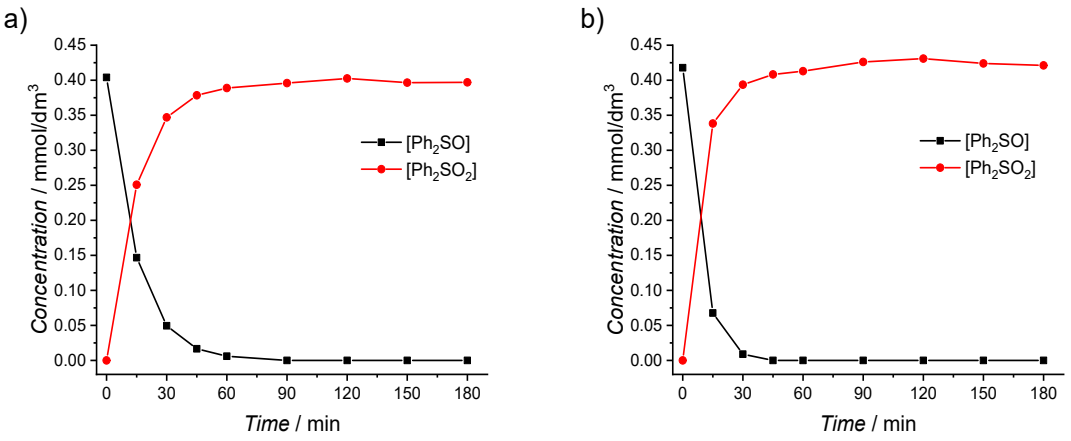

Figure S10. Concentration of reactants during Ph_2SO oxidation at anatase TRX_A materials in the dark (a), and upon irradiation (b).

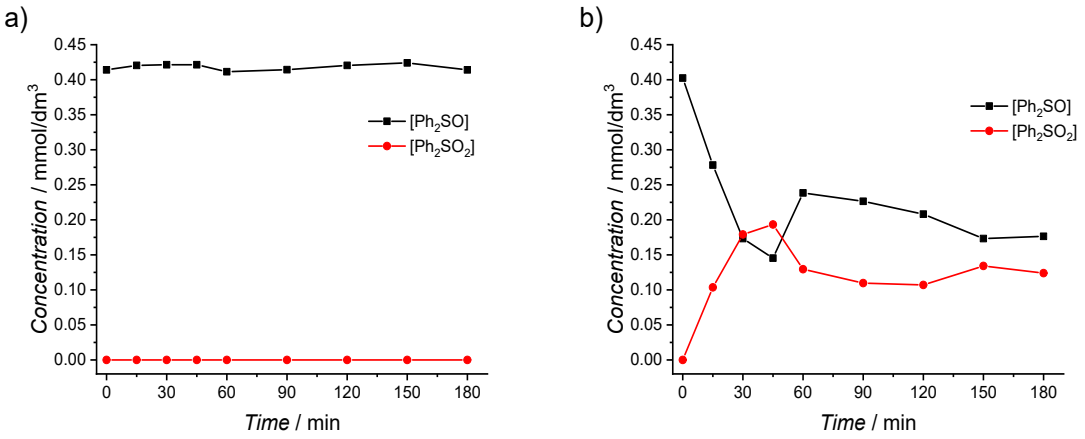

Figure S11. Concentration of reactants during Ph_2SO oxidation at rutile CR-EL materials in the dark (a), and upon irradiation (b).

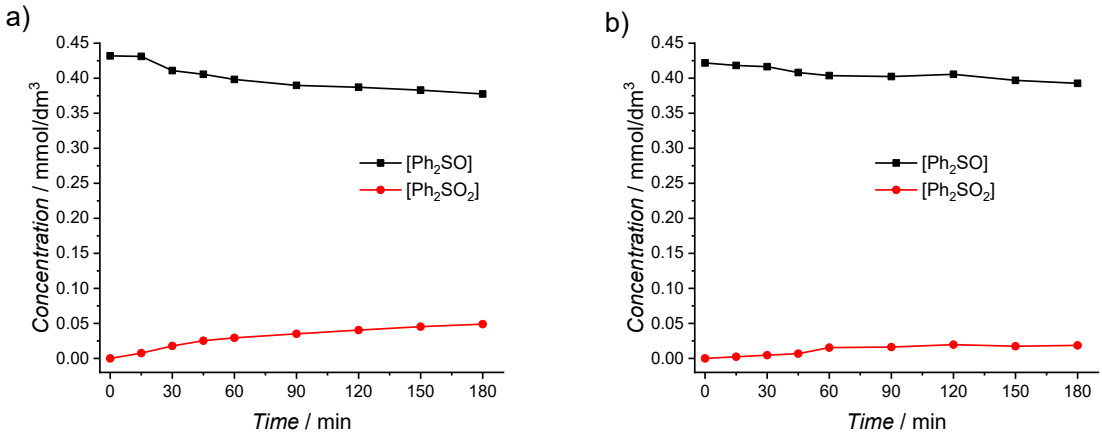

Figure S12. Concentration of reactants during Ph_2SO oxidation at a) anatase TRX_A, and b) rutile CR-EL materials upon irradiation without H_2O_2.