Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Co_2SnO_4 nanoparticles as high performance catalyst for oxidative degradation of Rhodamine B dye and pentachlorophenol by activation of peroxymonosulfate

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Catalytic activity of Co(II) and Sn(IV)

The catalytic activity of Co(II) and Sn(IV) for the degradation of RhB dye was evaluated in an aqueous solution. The degradation reaction was carried out in a spectrometric quartz cuvette. 10 μL of $CoCl_2$ catalyst (5 μM) was added into 2 mL aqueous solution of RhB (12.5 μM) under constant stirring. The suspension was continuously stirred for about 30 min to reach an adsorption-desorption equilibrium between RhB dye and catalyst under dark conditions. Then, 2.4 μL of peroxymonosulfate (PMS) (0.3 mM) was added to the stable aqueous dye solution under constant stirring. The concentration of RhB was determined using UV-vis spectrophotometry by monitoring the changes in the absorbance maximum at 554 nm.

Similarly, the performance of Sn(IV) for PMS activation was investigated under the same experimental conditions. 10 μL of $SnCl_4.5H_2O$ catalyst (5 μM) was added into 2 mL aqueous solution of RhB (12.5 μM) under constant stirring. The suspension was continuously stirred for about 30 min to reach an adsorption-desorption equilibrium between RhB dye and catalyst under dark conditions. Then, 2.4 μL of peroxymonosulfate (PMS) (0.3 mM) was added to the stable aqueous dye solution under constant stirring. The concentration of RhB was determined using UV-vis spectrophotometry by monitoring the changes in the absorbance maximum at 554 nm.

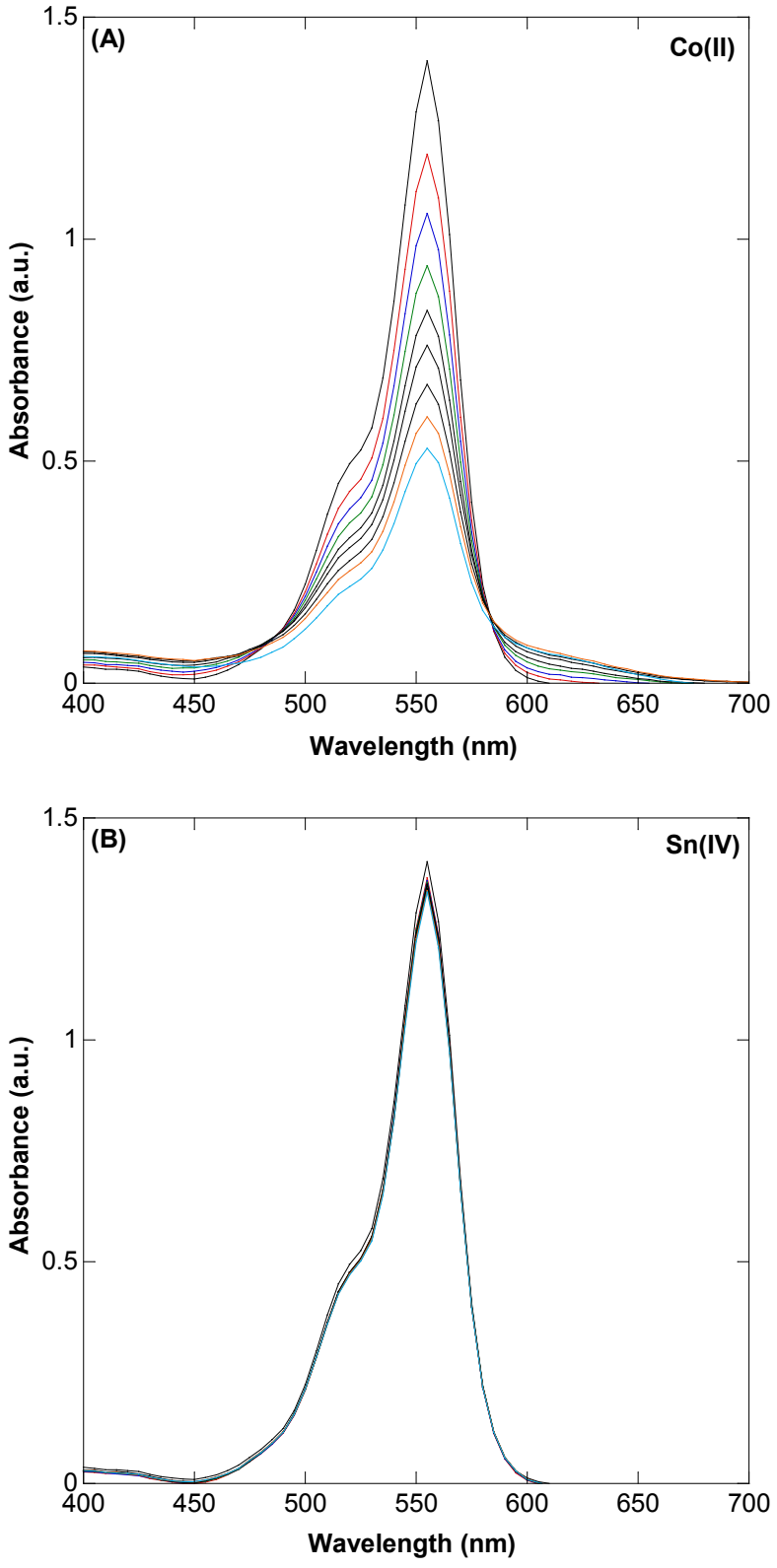

Figure S1. UV-vis absorbance spectra of catalytic degradation of RhB (12.5 µM) using 0.5 µM of $CoCl_2$ (A) and 0.5 µM of $SnCl_4.5H_2O$ (B) in the presence of 0.3 mM of PMS.

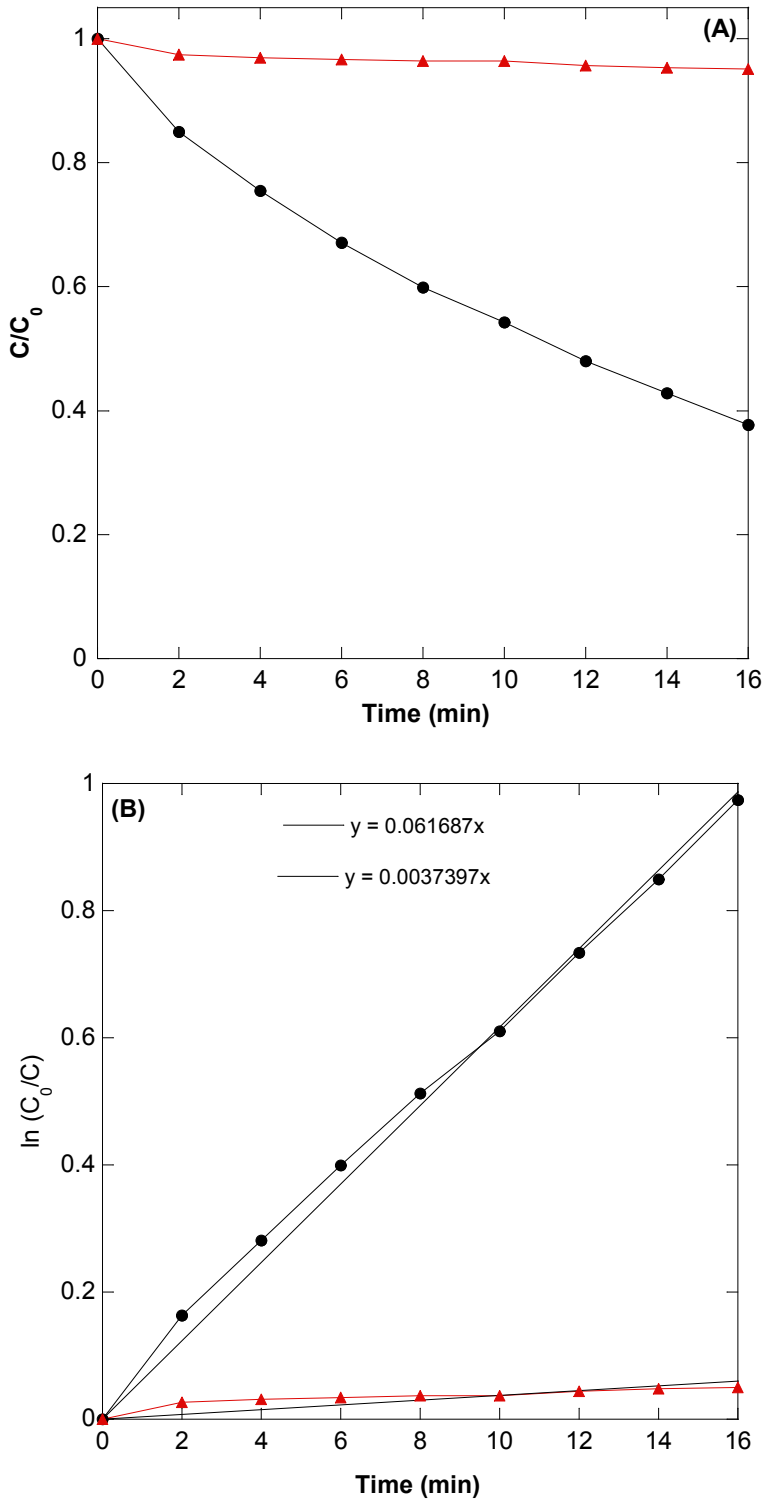

Figure S2. (A) Temporal course of the catalytic degradation of RhB (12.5 µM), (B) degradation kinetics with first order linearity of $\ln(C_0/C) = kt$ using 0.5 µM of $CoCl_2$ and 0.5 µM of $SnCl_4.5H_2O$ in the presence of 0.3 mM of PMS.