

## Supplementary information

### Modeling Coupled Kinetics of Antimony Adsorption/Desorption and Oxidation on Manganese Oxides

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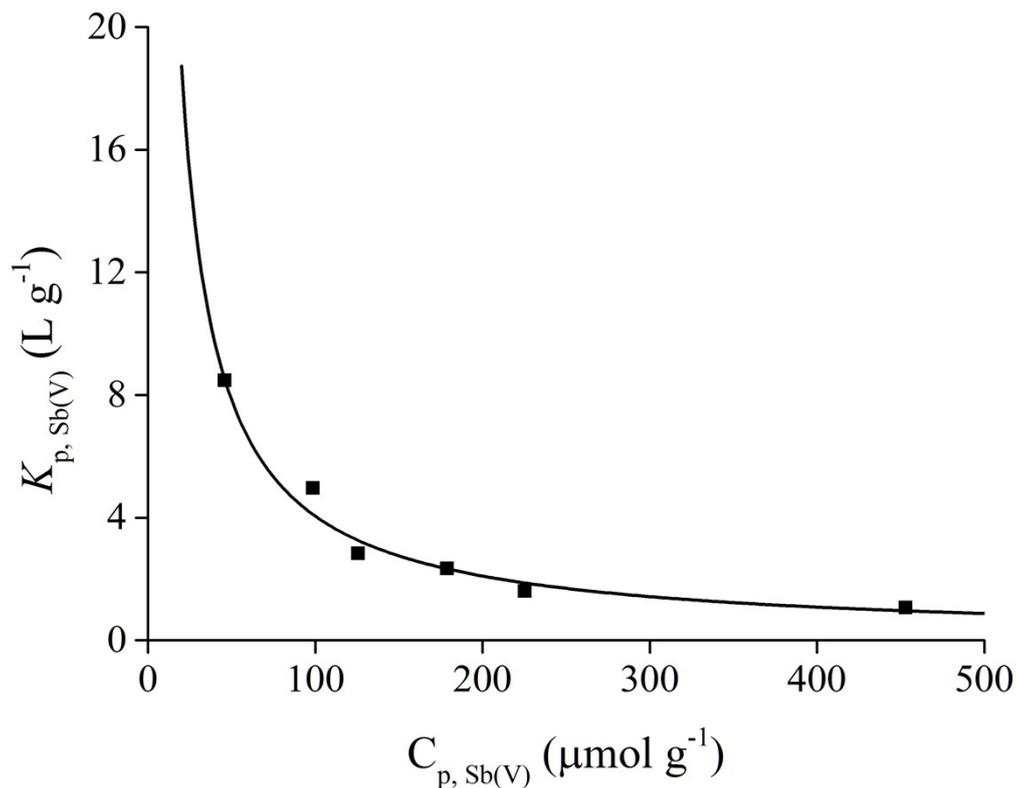
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**Fig. S1** The equilibrium partition coefficient ( $K_{p, Sb(V)}$ ) in the nonlinear adsorption process at various adsorbed Sb(V) concentrations ( $C_{p, Sb(V)}$ ) on  $\delta\text{-MnO}_2$ .  $K_{p, Sb(V)}$  as a function of  $C_{p, Sb(V)}$  was determined from the adsorption isotherm experiment at pH 7.0. Symbols are experimental data, while the line is the model fit to provide a continuous function.

**Table S1.** Root mean square errors (RMSE) of the model fits.

Kinetic experiments		RMSE ( $\mu\text{M}$ )	RMSE (%) <sup>†</sup>
Batch (Sb(V) only)	1420 $\mu\text{M}$ Sb(V)	95.3	6.7
	570 $\mu\text{M}$ Sb(V)	33.3	5.8
	150 $\mu\text{M}$ Sb(V)	11.6	7.6
Stirred-flow	$[\text{Sb(III)}]_0 = 110 \mu\text{M}$	12.7	11.5
Batch (Sb(III) only)	pH = 4.0	29.0	18.3
	pH = 6.0	19.8	12.5
	pH = 7.0	15.9	10.0
	pH = 8.0	15.5	9.7
Batch (pH = 7.0) (Sb(III) and Sb(V) or Mn(II))	10 $\mu\text{M}$ Sb(V)	10.0	5.9
	40 $\mu\text{M}$ Sb(V)	4.5	2.3
	10 $\mu\text{M}$ Mn(II)	14.1	8.9
	40 $\mu\text{M}$ Mn(II)	13.2	8.3

<sup>†</sup> calculated by dividing the RMSE values by the initial Sb concentrations.