

Supporting Information

Different design strategies of metal sulfide sorbents to capture low concentrations of gaseous Hg⁰ in coal-fired flue gas and high concentrations of gaseous Hg⁰ in smelting flue gas

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Content including: five pages, one table and three figures.

Table S1 The amounts of Hg⁰ captured by sulfureted Mo/FeTiO_x/mg g⁻¹

Hg ⁰ concentration		40 °C	60 °C	80 °C
4300 µg m ⁻³	without H ₂ O and SO ₂	15.7	16.8	16.0
	with H ₂ O and SO ₂	14.9	15.6	14.2
110 µg m ⁻³	without H ₂ O and SO ₂	5.25	5.96	4.31
	with H ₂ O and SO ₂	4.68	5.52	4.05

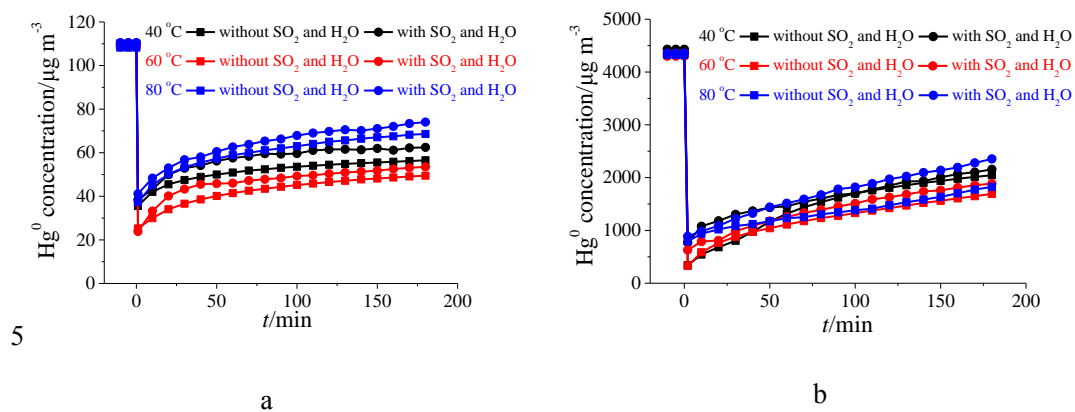


Figure S1 (a), Effect of H₂O and SO₂ on the adsorption of low concentrations of gaseous Hg⁰ onto sulfured Mo/FeTiO_x. Reaction conditions: sorbent mass = 5 mg, total flow rate = 500 mL min⁻¹, MHSV = 6,000,000 cm³ g⁻¹ h⁻¹, [O₂] = 5% (when used), [H₂O] = 8% (when used), and [SO₂] = 80 ppm (when used);

(b), Effect of H₂O and SO₂ on the adsorption of high concentrations of gaseous Hg⁰ onto sulfured Mo/FeTiO_x. Reaction conditions: [Hg⁰] = 4300 µg m⁻³, sorbent mass = 10 mg, total flow rate = 300 mL min⁻¹, MHSV = 1,800,000 cm³ g⁻¹ h⁻¹, [O₂] = 7% (when used), [H₂O] = 8% (when used), and [SO₂] = 1% (when used).

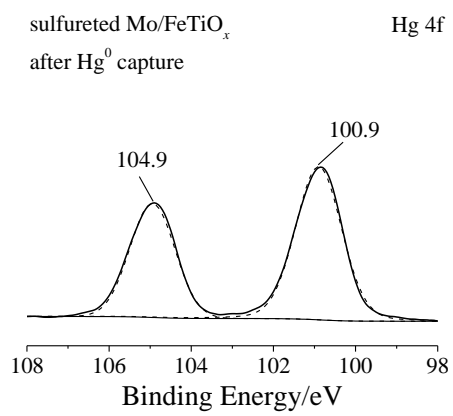
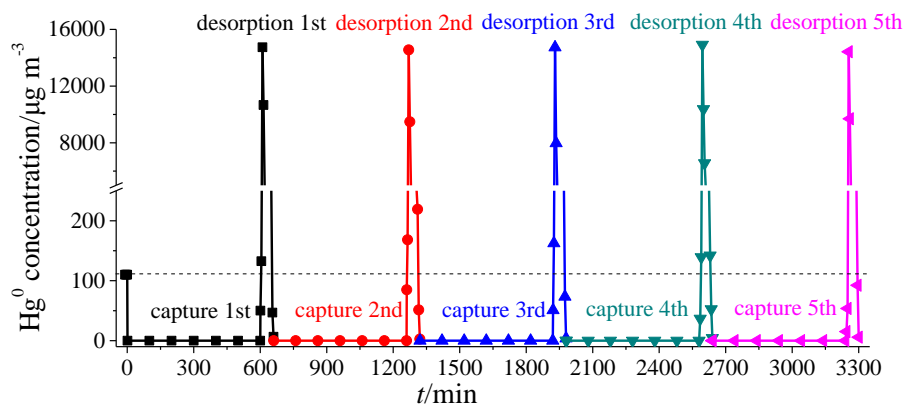
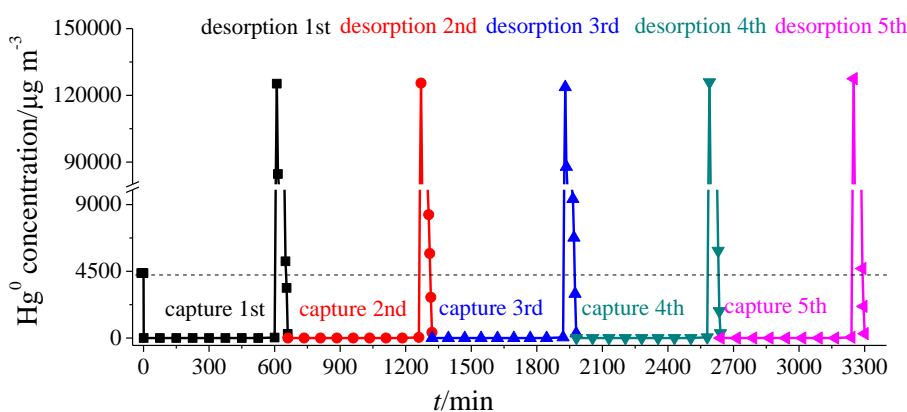


Figure S2 XPS spectra for sulfured Mo/FeTiO_x after Hg⁰ capture in Hg 4f spectral region



a



b

Figure S3 (a), Five cycles of the enrichment of gaseous Hg^0 in CFG using reproducible sulfured Mo/FeTiO_x . Operating conditions of Hg^0 capture: adsorption temperature = 60 °C, $[\text{Hg}^0] = 110 \mu\text{g m}^{-3}$, $[\text{O}_2] = 5\%$, $[\text{H}_2\text{O}] = 8\%$, $[\text{SO}_2] = 80 \text{ ppm}$, sorbent mass = 50 mg, total flow rate = 500 mL min^{-1} , and $\text{MHSV} = 6.0 \times 10^5 \text{ cm}^3 \text{ g}^{-1} \text{ h}^{-1}$; Operating conditions of Hg^0 desorption: desorption temperature = 400 °C, total flow rate of air = 100 mL min^{-1} , and $\text{MHSV} = 1.2 \times 10^5 \text{ cm}^3 \text{ g}^{-1} \text{ h}^{-1}$.

(b), Five cycles of the enrichment of gaseous Hg^0 in SFG using reproducible sulfured Mo/FeTiO_x . Operating conditions of Hg^0 capture: adsorption temperature = 60 °C, $[\text{Hg}^0] = 4300 \mu\text{g m}^{-3}$, $[\text{O}_2] = 7\%$, $[\text{H}_2\text{O}] = 8\%$, $[\text{SO}_2] = 1\%$, sorbent mass = 150 mg, total flow rate = 300 mL min^{-1} , and $\text{MHSV} = 1.2 \times 10^5 \text{ cm}^3 \text{ g}^{-1} \text{ h}^{-1}$. Operating conditions of Hg^0 desorption: desorption temperature = 400 °C and total flow rate of air = 100 mL min^{-1} , and $\text{MHSV} = 4.0 \times 10^4 \text{ cm}^3 \text{ g}^{-1} \text{ h}^{-1}$.