

ELECTRONIC SUPPLEMENTARY INFORMATION FOR THE PAPER

“Ion Exchange And Intercalation Properties Of Layered Double Hydroxides Towards Halide Anions”

EXPERIMENTAL

1. Cl⁻/CO₃²⁻ isotherm

To obtain the isotherm Cl⁻/ CO₃²⁻ eleven samples were prepared by equilibrating, under stirring, 600 mg of [Zn_{0.61}Al_{0.39}(OH)₂]Cl_{0.39}·0.47H₂O (ion exchange capacity of 3.65 mequiv/g) with 2.2, 4.4, 5.5, 6.6, 7.7, 8.8, 9.9, 11.0, 13.1, 16.4, 32.9 ml of 0.05 M of Na₂CO₃ aqueous solution for 3 days at 25°C. The solids were recovered by centrifugation, washed three times with CO₂-free deionized water and dried at 75% relative humidity (RH). The content of chloride anions in the solids was measured by ion chromatography and the results were expressed as ionic fraction of CO₃²⁻ in the solution and in the solid (mequiv CO₃²⁻ / (mequiv CO₃²⁻ + mequiv Cl⁻)).

2. Preparation of halide-LDH derivatives

Forward isotherm Cl⁻/F⁻

To obtain the forward isotherm Cl⁻/F⁻ six samples were prepared by equilibrating, under stirring, 600 mg of [Zn_{0.61}Al_{0.39}(OH)₂]Cl_{0.39}·0.47H₂O (ion exchange capacity of 3.65 mequiv/g) with 2.2, 4.4, 8.8, 13.1, 17.5, 22.0 ml of 0.1 M of NaF aqueous solution for 7 days at 25°C.

Forward isotherm Cl⁻/Br⁻

To obtain the forward isotherm Cl⁻/Br⁻ ten samples were prepared by equilibrating, under stirring, 600 mg of [Zn_{0.61}Al_{0.39}(OH)₂]Cl_{0.39}·0.47H₂O with 4.2, 6.9, 9.7, 12.5, 15.3, 18.4, 23.6, 27.8, 200, 250 ml of 0.1 M of NaBr aqueous solution for 7 days at 25°C.

Reverse isotherm Cl⁻/Br⁻

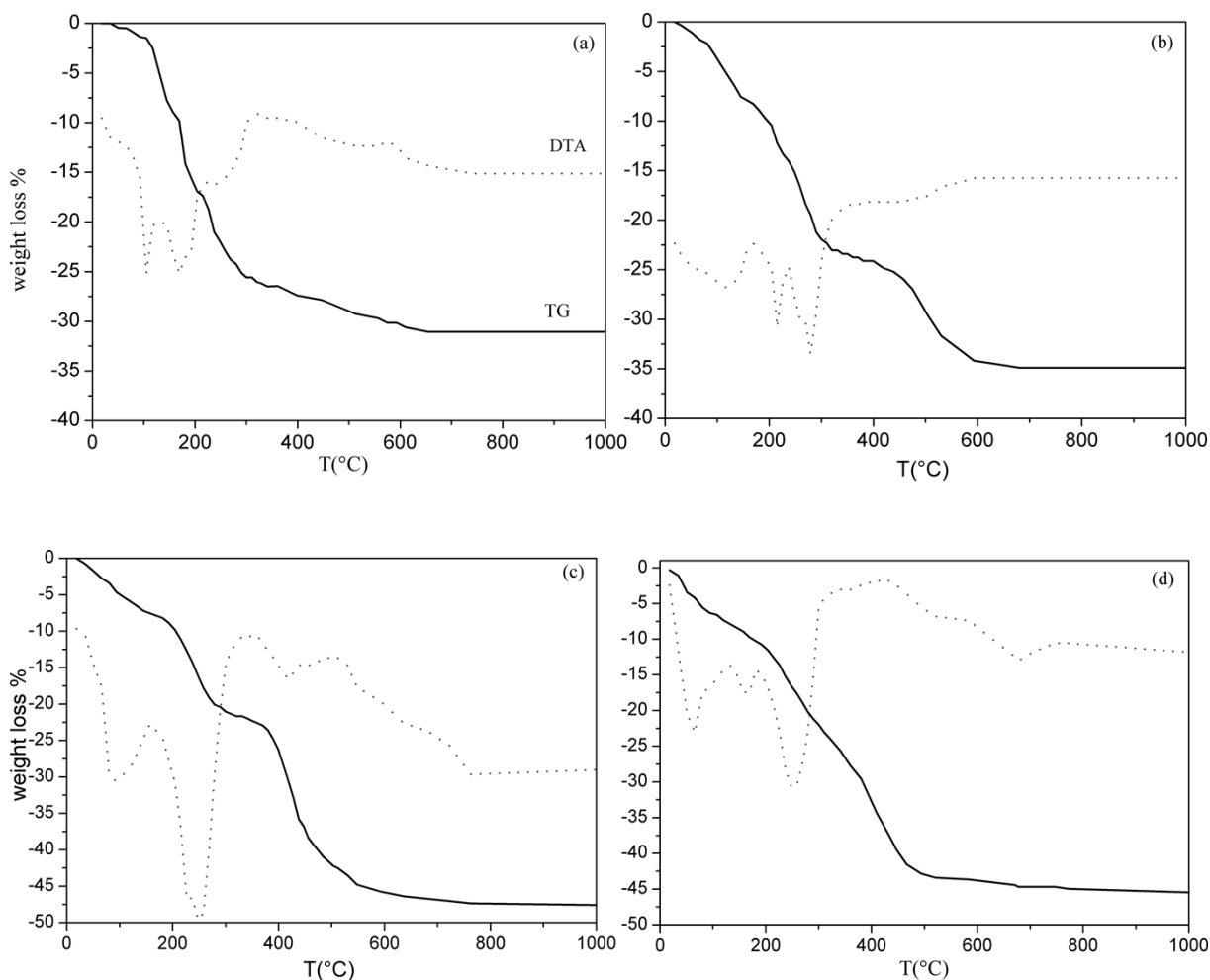
To obtain the reverse isotherm Cl⁻/Br⁻ six samples were prepared by equilibrating, under stirring, 600 mg of [Zn_{0.61}Al_{0.39}(OH)₂]Br_{0.39}·0.52H₂O (ion exchange capacity of 3.12 mequiv/g) with 5, 10, 15, 20, 30, 60 ml of 0.1 M of NaCl aqueous solution for 7 days at 25°C.

Forward isotherm Cl⁻/I⁻

To obtain the forward isotherm Cl⁻/I⁻ five samples were prepared by equilibrating, under stirring, 600 mg of [Zn_{0.61}Al_{0.39}(OH)₂]Cl_{0.39}·0.47H₂O with 2.2, 4.4, 8.8, 13.1, 43.8 ml of 0.1 M of NaI aqueous solution for 7 days at 25°C.

The solids were recovered by centrifugation, washed three times with CO₂-free deionized water and dried at 75% RH. The content of halide (X⁻ = fluoride, bromide and iodide) and chloride in the solids were measured by ion chromatography and the results were expressed as X⁻ molar fraction in the solution and in the solid (mequiv. X⁻/(mequiv. X⁻ + mequiv. Cl⁻)).

TG and DTA analysis



TG and DTA curves of ZnAl-F (a), ZnAl-Cl (b), ZnAl-Br (c) and ZnAl-I (d) of Table 2. Atmosphere: air flow 30 ml/min and heating rate of 10°C/min.