

# Syntheses and Applications of Layered Metal Hydroxides

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### I. Syntheses of Nanosheets of Layered Metal Hydroxides

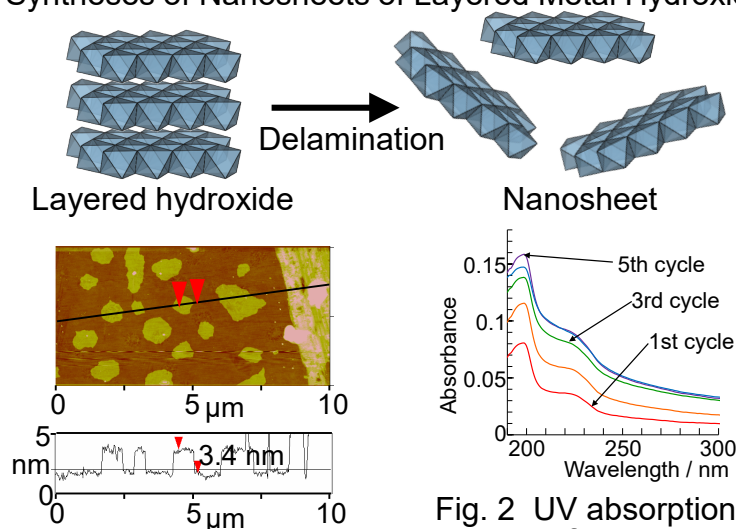


Fig. 1 AFM image of cobalt hydroxide nanosheets

Fig. 2 UV absorption spectra of restacking of nickel hydroxide nanosheets

### II. Control of Interlayer ions in Layered Metal Hydroxides

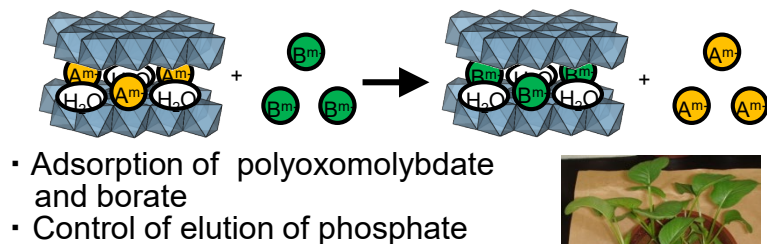


Fig. 3 Growing tests of Japanese mustard spinach using a Mg/Fe-type layered double hydroxide



### Content:

The layered metal hydroxide is a layered compound consisted of repeating stacking of nano-meter-sized metal hydroxides. This compound is mainly synthesized by addition of base into the metal solution.

Inorganic nanosheets have been prepared by delamination of layered materials. Nanosheet has an ultimate two-dimensional anisotropy and manifests unique physical properties arising from size effects. We have synthesized nickel and cobalt hydroxides nanosheets (Fig. 1) and assembled these nanosheets by stacking on the glass slide to make new lamella structure (Fig. 2).

Layered double hydroxide is a layered compound that contains divalent and trivalent metal ions. It consists of hydroxide layer and interlayer anion, and the interlayer anion is captured and able to exchange. We use this property for adsorption and controlled-release of anions. Adsorption of polyoxomolybdate and borate control of elution of phosphate have been investigated and try to apply it to fertilizer (Fig. 3).

Keywords: layered compound, metal hydroxide, nanosheet, ion exchange

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