Microwave Synthesis, Decarbonation, Anion-Exchange and Delamination of Layered Double Hydroxide

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Combine the microwave synthesis and urea hydrolysis methods; we firstly achieved the rapid synthesis of Mg-Al layered double hydroxides (LDH) with good hexagonal plate-like morphology within one hour. In order to improve its anion-exchange ability, microwave synthesized LDH was decarbonized in the NaCl and HCl mixed solution and Cl--LDH was obtained. There was no obvious morphology change during the decarbonation reaction. After anion-exchange with NaNO3 aqueous solution, Cl anion was exchanged by NO3- anion and NO3--LDH was obtained. NO3--LDH sample was successfully delaminated in formamide under sonification and the transparent gel was formed. Structures of LDH samples were confirmed by powder X-ray diffraction (XRD) and FT-IR spectroscopy. Simultaneous thermogravimetric/differential thermal analysis (TG/DTA) and scanning electron micrograph (SEM) technologies were also applied to the characterization of LDH samples.