NANO LAYERED HYBRID MATERIALS BASED ON CO-TI-SI LDH

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Abstract

Layered double hydroxides (LDHs) and anionic clay are nano-ordered layered compounds and are well known for their ability to intercalate anionic compounds. Most LDH are prepared conventionally only with di- and tri-valent cations. In this study, Co-Ti-Si layered double hydroxide was prepared for the first time. By intercalation reaction with monocarboxylic acid at room temperature, Co-Ti-Si nanohybrid material was synthesized via anion exchange process. The Co-Ti-Si LDH and intercalated compounds were characterized by chemical analysis (C, H, N analysis and EDS), X-ray diffraction (XRD), infrared spectra (IR), thermal analyses (TG and DTA) and scanning electron microscope (SEM). The insertion of cyanate and carbonate anions into LDH was confirmed by chemical analysis and IR spectra. XRD patterns of the prepared Co-Ti-Si LDH showed that the interlayer spacing of the LDH is 0.78 nm. After intercalation reactions with monocarboxylic acid, the interlayer spacing of Co-Ti-Si LDH increased and organic–inorganic nano-hybrid materials formed. SEM images showed that the morphology of Co-Ti-Si LDH and nanohybrid are plate-like structure coincidence with the usual LDH.

Keywords: Preparation; intercalation; new layered double hydroxide; nanohybrid

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