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Structural and textural properties of pillared montmorillonite at intercalation of large Al- and Al/Ce-polyhydroxocomplexes

Butman M., Belozerov A., Karasev N., Kochkina N., Khodov I., Ovchinnikov N.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015, Pleiades Publishing, Ltd. The possibility of adjusting the separation of silicate layers in montmorillonite in a broad range of basal distances d_{001} (1.3–2.4 nm) at the intercalation of large (0.7–1.8 nm) polyhydroxocomplexes of aluminum ($[Al_{13}O_4(OH)_{24}(H_2O)_{12}]^{7+}$, $[Al_{30}O_8(OH)_{56}(H_2O)_{24}]^{18+}$) and aluminum/cerium synthesized through the combined hydrolysis of aluminum and cerium salts in a reactor under pressure is shown. The formation of polyhydroxocomplexes was controlled by the methods of ^{27}Al NMR and photon correlation and fluorescent spectroscopy at different concentrations of Al^{3+} ions (2.5–5.1 M) in solution. Textural properties (specific surface area, total pore volume, and mesoporosity) and fractal dimensionality of the samples of intercalated montmorillonite obtained by annealing at 300°C have been determined using the method of low-temperature nitrogen adsorption-desorption.

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