
One-Step Synthesis of Alkyltrimethylammonium-Intercalated Magadiite

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Abstract: Cetyltrimethylammonium- and tetradecyltrimethylammonium-intercalated magadiites were prepared by direct syntheses, starting from sodium metasilicate ($\text{Na}_2\text{O}/\text{SiO}_2 = 1.0$) and nitric acid. Total substitution of sodium by cetyltrimethylammonium or tetradecyltrimethylammonium cations was not achieved in the range of surfactant: silicon molar ratios used in this study. When a phosphonium-based surfactant replaces the ammonium surfactants in the same procedure, the result of the synthesis is a mixture of quartz and unmodified surfactant. If dodecylammonium bromide is used, an MCM-41 molecular sieve is obtained. The substitution of the silicon source by tetramethylammonium silicate or of nitric acid by hydrochloric, hydrofluoric, or acetic acids also yields MCM-41 molecular sieves, indicating that the formation of magadiite is greatly dependent on the presence of sodium cations and nitrate anions.

Key Words: Alkylammomium-Intercalated Magadiite • Intercalation • Magadiite • Organo-Magadiite

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