
Pillaring Processes of Smectites with and without Tetrahedral Substitution

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Abstract: Pillaring of montmorillonite and beidellite with aluminum polyhydroxypolymer takes place first by the saturation of the cation-exchange capacity by monomeric and/or dimeric aluminum hydroxide species and then the intercalation of the so-called Al₁₃-polyhydroxypolymer. The clay slurry must have a solid concentration greater than 0.01% (w/w) to produce a basal spacing of about 18 Å. Sizeable clay tactoids must therefore exist in the slurry in order to produce a turbostratic structure ordered along the *c* axis. The main difference between pillared montmorillonite and pillared beidellite seems to be a more ordered distribution of pillars within the interlamellar space of the clays that are rich in tetrahedral substitutions. Recent ²⁷Al and ²⁹Si high-resolution nuclear magnetic resonance data suggest that this higher degree of ordering results from the reaction of the aluminic pillars and the clay sheet near the sites of the tetrahedral substitutions.

Key Words: Beidellite • Hydroxy-aluminum complex • Nuclear magnetic resonance • Pillared interlayered complex • Smectite • Tetrahedral substitution

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