
Preparation and Characterization of Bidimensional Zeolitic Structures Obtained from Synthetic Beidellite and Hydroxy-Aluminum Solutions

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Abstract: Beidellite was synthesized hydrothermally from a noncrystalline gel at 320° C and 130 bar pressure. The beidellitic character of the product was verified by infrared spectroscopy on the NH₄⁺-exchanged form. Intercalation was achieved with hydroxy-aluminum solutions having different OH/Al molar ratios. The solutions were investigated by several methods, including ²⁷Al nuclear magnetic resonance. Essentially, two Al species were detected: monomeric Al and a polymerized form containing Al in four-fold coordination. This latter species was found to be selectively fixed in the interlamellar region, which resulted in a stable spacing of 18 Å at 110° C and 16.2 Å at 700° C. The pillared beidellites had specific surface areas of >300 m²/g, mainly due to micropores. Both Brønsted and Lewis acid sites were evidenced by infrared spectroscopy using pyridine as a probe molecule.

Key Words: Acid sites • Beidellite • Hydroxy-Al • Infrared spectroscopy • Nuclear magnetic resonance • Pillaring • Synthesis

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