
Hydrothermal Formation of a Kaolinite-Like Product from Noncrystalline Aluminosilicate Gels¹

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Abstract: Noncrystalline aluminosilicate gels with $\text{Al}_2\text{O}_3/(\text{Al}_2\text{O}_3 + \text{SiO}_2)$ weight ratios from 0.3 to 0.5 were reacted in 0.1 N KOH at temperatures varying from 125° to 175° C. The pH of the solutions dropped sharply with increasing gel:solution ratios, indicating that the coordination number of Al in the products changed from IV to VI. The degree of hydrolysis appeared to be higher with KOH than with NaOH. X-ray powder diffraction and infrared spectroscopy showed that disordered kaolinite was the only crystalline product formed. Thermal data and surface area measurements indicated that the kaolinite was formed by a condensation process.

Key Words: Aluminosilicate • Gel • Infrared spectroscopy • Kaolinite • Synthesis • X-ray powder diffraction

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