
A Synthetic Na-Rich Mica: Synthesis and Characterization by ^{27}Al and ^{29}Si Magic Angle Spinning Nuclear Magnetic Resonance Spectroscopy

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Abstract: A swelling mica, $\text{Na}_2\text{Mg}_3(\text{Al}_2\text{Si}_2)\text{O}_{10}\text{F}_2 \cdot x\text{H}_2\text{O}$, (hereafter " Na-4 mica") was synthesized from metakaolinite + MgO and Mg aluminosilicate gels at different temperatures and durations using NaF flux. The various samples were characterized by powder X-ray diffraction (XRD), scanning electron microscopy (SEM), and ^{27}Al and ^{29}Si magic angle spinning nuclear magnetic resonance (MAS NMR) spectroscopy. The results showed that phase-pure Na-4 mica was obtained from metakaolinite which serves as a cost-effective aluminosilicate source. ^{27}Al MAS NMR spectra showed that all or nearly all Al is in tetrahedral coordination whereas ^{29}Si MAS NMR spectra showed that the nearest neighbor environment of Si is mainly Si(3Al), as expected based on the Si:Al ratio.

Key Words: KGa-1 • MAS NMR Spectroscopy • Metakaolinite • Mica • Na Mica • Synthetic Clay Mineral

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