Preparation and Handling of Dithionite-Reduced Smectite Suspensions

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Abstract: Using Garfield, Washington, nontronite as the model mineral system, methods and apparatus were developed to prepare reduced suspensions in citrate-bicarbonate-dithionite (CBD) solution. These techniques were effective in removing excess, undesired solutes from reduced suspensions while maintaining a high Fe^{2+} content. They also enabled the preparation of dried, reduced films preferentially oriented with respect to the crystallographic *c*-axis. Supernatant solutions were collected and analyzed for Fe, Al, and Si, from which the extent of dissolution of the clay as a result of CBD treatment was assessed. Results indicated that very little Fe and Si were released to solution, but as much as about 8% of the total Al was solubilized. The highest levels of Al in solution Were observed in CB treatments without dithionite.

Key Words: Dithionite • Iron • Nontronite • Reduction • Reoxidation • Smectite

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