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# Kinetics of Dissolution of Noncrystalline Oxides and Crystalline Clay Minerals in a Basic Tiron Solution

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**Abstract:** The dissolution behavior of five noncrystalline oxides, montmorillonite, kaolinite, chlorite, and sepiolite in a basic tiron solution was studied at pH 10.5 and 80° C. The results show that for montmorillonite the concentrations of Al and Fe ions dissolved in the treating solution were diminished because of cation-exchange reactions of the sample in the suspension. To explain these observations, a mass-balance equation for the specified cation in solution was formulated, which consisted of both a dissolution term and an ion-exchange term. The several parameters of this differential equation were fitted to allow the calculated results to represent the experimental findings. Using these values, an equation lacking an ion-exchange term was also solved numerically. Thus, a dissolution curve was described, which would have been obtained had no cation exchange taken place. From these equations, the error resulted from the cation-exchange capacity of samples in chemical dissolution methods can be evaluated. According to this estimation, and assuming the value for a 1-hr treatment, an error of about 15% was determined for the amount of noncrystalline components contained in the specimen in this investigation.

**Key Words:** Chlorite • Dissolution • Kaolinite • Montmorillonite • Noncrystalline • Sepiolite • Tiron solution

*Clays and Clay Minerals*; June 1990 v. 38; no. 3; p. 308-314; DOI: [10.1346/CCMN.1990.0380310](https://doi.org/10.1346/CCMN.1990.0380310)

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