
Multiple-Ion Diffusion—I. Techniques for Measuring and Calculating Apparent Self-Diffusion Coefficients in Heteroionic Systems*

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Abstract: This investigation was designed to integrate the quick-freeze technique for ion diffusion with two computer programs to permit the simultaneous measurement and calculation of the diffusivity of a variable number of ions in heteroionic soil system. Kaolinite clay was prepared so as to have the following percentage saturations of the CEC, Sr²⁺65, Mg²⁻15, Rb⁺10, Na⁺5 and H⁺5. A quadruplicate radioisotope tag consisting of ⁸⁵Sr, ²⁸Mg, ⁸⁶Rb, and ²²Na was used to measure the diffusivity of each ion. The complex spectra were resolved by use of Schonfeld's revised Alpha-M computer program. A probit-transformation procedure was formulated into a computer program to enable the calculation of each diffusion coefficient. These programs are described and illustrated with the diffusivity of ⁸⁶Rb in kaolinite clay.

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