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ABSTRACT:

A Novel Non-Isothermal Method to Measure the Chemical Diffusivity of a Mixed-Conductor Compound

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The chemical diffusivity of a mixed ionic-electronic conductor compound has conventionally been determined by analyzing property relaxation kinetics typically under an applied chemical or electric potential difference at uniform temperature. Commonly monitored observables include the electrical conductivity and the mass of the system compound.

In this contribution, we introduce a novel non-isothermal method for measuring chemical diffusivity based on the thermomigration kinetics of a closed system compound. The underlying principle of the method and its experimental implementations are described in detail. Finally, the non-isothermal approach is compared with conventional isothermal methods, e.g., electrical conductivity relaxation (ECR) method, in terms of experimental feasibility and measurement uncertainty.