263a Multicomponent Aerosol Coagulation - Similarity Solutions and Moment Models

R. Bertrum Diemer Jr. and Jon H. Olson

Coagulation of aerosols having more than one component is an important topic in atmospheric modeling as well as for in situ coating of powders in aerosol reactors. In this paper, a general scaled formulation is developed for the n-component constant kernel problem. A variable transformation of the two-component problem is also developed that allows (1) decoupling of the size and composition variables, (2) permits demonstration of a similarity solution, and (3) enables basis function identification for reconstruction of approximate bivariate trajectories from the moments in the transformed variables. This is demonstrated for the coagulation of two initially monodisperse, single-component aerosols to form a polydisperse, two-component aerosol.