

DSMC MULTICOMPONENT AEROSOL DYNAMICS: SAMPLING ALGORITHMS AND AEROSOL PROCESSES

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ABSTRACT

The focus of this research is on the use of the Direct Simulation Monte Carlo (DSMC) technique to elucidate the role of various phenomena that influence the evolution of nuclear aerosols. Several sampling algorithms and aerosol processes such as coagulation, deposition, condensation, and source reinforcement are explored for a multi-component, aerosol dynamics problem in a spatially homogeneous medium. Several test problems are simulated using the DSMC technique. The DSMC results obtained are verified against the analytical results for appropriate test problems. Additionally, the DSMC results are compared against those obtained from the sectional method for several multi-component test problems with same component densities. It is clear from the results that the assumption of a single mean density is not appropriate due to the complicated effect of component densities on the aerosol processes.