

Title: Lower Order Representations of Evolving Particle Size Distributions for Faster Simulation of Gas-Particle Mass Transfer within ESPs.

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The range of particle sizes typically present in combustion flue gas complicates predictions of gas-particle mass transfer processes. This complexity is amplified within electrostatic precipitators where particle motion, abundance, and mass transfer characteristics are size dependent. The present study illustrates the utility of replacing explicit representations of particle size distributions in simulations of electrostatic precipitators with an equivalent loading of monodisperse aerosols of diameter chosen to reproduce the same gas-particle mass transfer characteristics. Computational times are reduced by an order of magnitude using this approach, facilitating future incorporation of multiple particle types or heterogeneous chemical kinetics.