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Tracking the Evolution in Soot Aggregate Optical Properties Concurrently with its Morphology[1] OGOCHUKWU ENEKWIZU, DIVJYOT SINGH, ALEXEI KHALIZOV, New Jersey Inst of Tech — Radiative forcing by soot is strongly dependent on particle morphology and mixing state, which are complex and subject to change during atmospheric aging. Our previous research showed that fractal soot aggregates can restructure in the presence of particularly thin coatings. Recently, we developed an algorithm to model aggregate restructuring and found that individual aggregates with the same initial fractal parameters can end up with varying levels of compactness. In this study, we examine the impact of structural evolution on the optical properties of thinly coated soot. We apply our restructuring algorithm to an ensemble of fractal aggregates with the same initial morphological parameters. As each aggregate restructures, we extract and save morphologies that match a set of predefined fractal parameters. Using Discrete Dipole Approximation, we compare the optical properties of aggregates that were generated fractal and then restructured against those of aggregates that were generated compact. Additionally, we perform optical calculations on those fractal and compact aggregates after adding the coating material, which can be distributed as a uniform layer or localized in junctions between individual spheres in the aggregate. By tracking the evolution in optical properties of coated soot, the outcome of our findings will help improve the accuracy of radiative forcing by soot in atmospheric models.

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Ogochukwu Enekwizu
New Jersey Inst of Tech

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