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## Combustion and Flame

Volume 137, Issues 1–2, April 2004, Pages 63-72

# Size-range analysis of diesel soot with ultra-small angle X-ray scattering

Artur Braun <sup>a</sup> ... Gerald P. Huffman <sup>a</sup>

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<https://doi.org/10.1016/j.combustflame.2004.01.003>

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### Abstract

Carbonaceous soot produced in a small diesel engine test facility was investigated with ultra-small-angle X-ray scattering. Three soot samples produced using a reference diesel fuel and the reference fuel plus two oxygenate additives were investigated. The presence of objects at three typical size ranges, i.e., aggregates, primary particles, and subunits, was observed. By studying soot powders and pellets from pressed powder, a separation of scattering contributions from aggregates and primary particles was possible. The scattering curves of soot from oxygenated diesel show significant differences between samples obtained under idle and load conditions. Soot from regular diesel fuel did not show such differences.



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## Keywords

Soot; Combustion; Small-angle; X-ray scattering; Aggregation; Microstructure; Particle size

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