

NANO HIGHLIGHT

Nano Carbon Particles in the Atmosphere: Formation and Transformation

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PIs: **JoAnn S. Lighty, Ronald Pugmire, Adel Sarofim, Angela Violi, and Greg Voth**
Departments of Chemical Engineering and Chemistry, University of Utah

The University of Utah has assembled an interdisciplinary team specializing in combustion, computational chemistry, aerosol dynamics and analytical chemistry to address the important problem associated with the emission of carbonaceous nanoparticles from diesels. As part of this project, the University of Utah has begun collecting and analyzing nano-sized organic carbon (NOC) in collaboration with Professor D'Alessio et al.¹ (University of Naples) who have identified nanoparticles smaller than 5 nm in diesel exhaust. These NOC particles can be collected in the condensate of diesel exhaust. Preliminary UV-VIS spectra (Fig. 1) and transmission electron microscopy results confirm the existence of NOC particles, and NMR results indicate the presence of carbonyls and other oxygenated compounds in the NOC.

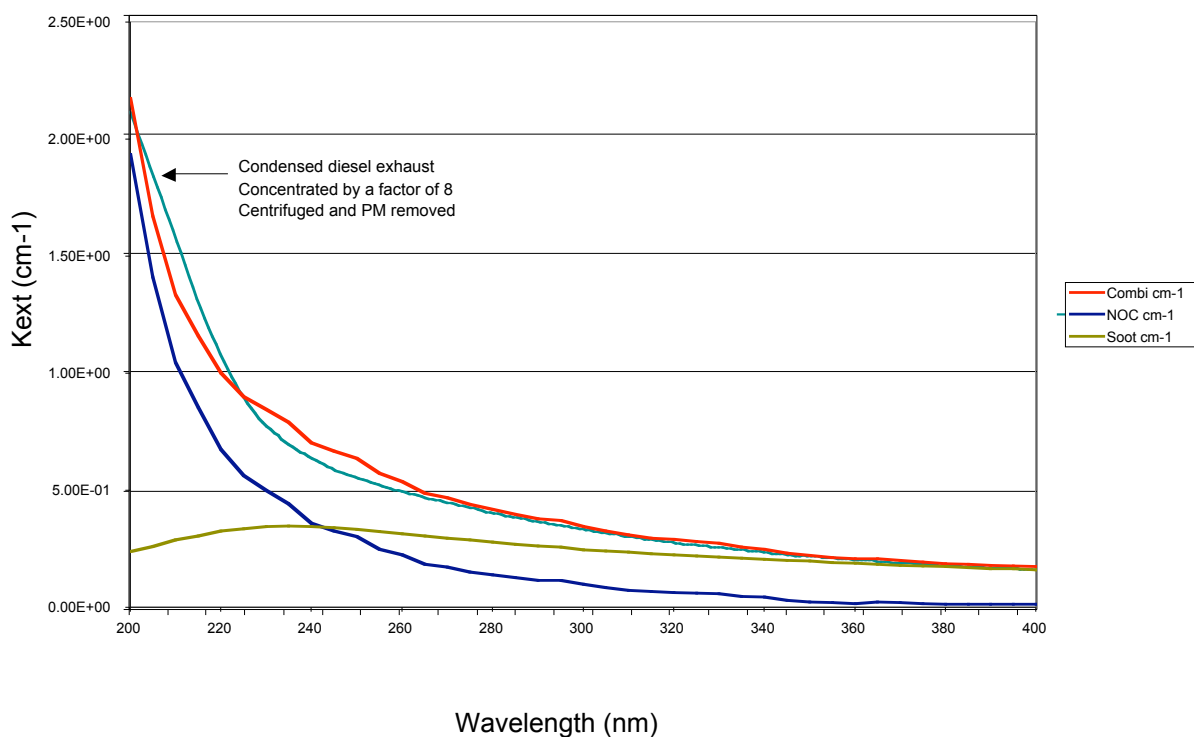


Fig. 1. Experimental UV-VIS spectra from condensed diesel exhaust compared to the UV-VIS spectra of soot, NOC, and the reconstructed combination of soot and NOC. Note the good agreement between the experimental results (green) and the reconstructed soot and NOC spectra (red).

Reference

[1] D. Alessio, A. Acampora, A. Borghese, I. Borelli, A. D'Anna, P. Minutolog, N. Miraglia, N. Sannolo, A. Simonelli, L. Sgro *Toxicological Examination of Combustion-Generated Nanoparticles Smaller than 5 nm*. Health Effects Institute, 2005.