

## **SPECTROSCOPIC ANALYSIS AND MODELING OF PARTICULATE FORMATION IN A DIESEL ENGINE**

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**ABSTRACT.** Combined measurements of scattering and extinction coefficients in the UV-visible range have been used to characterize the particulate formed in an optically accessible divided-chamber diesel engine. Multi-wavelength spectroscopic analysis has shown the presence of two classes of particles: soot and organic aerosol. The latter structures absorb light radiation in the UV region and have sizes of 2-3 nm. They are present just after fuel ignition and their concentration suddenly increases as the combustion proceeds, reaching a maximum value well before the formation of soot particles, which show particle sizes of about 10 nm in the first stages of the inception process. A detailed kinetic mechanism has been used to model the formation of both classes of particles in high-pressure conditions. The kinetic scheme, coupled to a simplified model of diesel combustion, has been able to correctly predict the total concentration and the size of the particulates.