

Laser Diagnostics of Diesel Particulate

by

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Abstract

A two-color extinction method that can measure the temporal mass concentration of soot aggregates in diesel exhaust has been proposed. Two laser beams in co-axial alignment transmit a soot-loaded exhaust gas flow, and the transmittance at each wavelength is detected simultaneously. The scattering-to-absorption ratio in the extinction coefficient for the soot aggregates is theoretically determined by the transmittance values measured at two wavelengths. The refractive index of the soot aggregates is also determined from the comparison of mass concentrations measured under steady operating conditions by both the extinction and paper filter methods. Determining the scattering-to-absorption ratio in the extinction coefficient and the refractive index allow significant improvement in the accuracy of the extinction method.

Keywords: Laser diagnostics, Diesel engine, Exhaust emission, Soot particles

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