

RESOLVING EMISSIONS DYNAMICS VIA MASS SPECTROMETRY: TIME RESOLVED MEASUREMENTS OF EMISSION TRANSIENTS BY MASS SPECTROMETRY

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High-speed diagnostics capable of accurately resolving emission transients are required to provide the most detailed understanding and optimization of active exhaust emissions treatment processes, such as NO_x adsorbers. A portable, mass spectrometry-based instrument with high temporal resolution, linear response and broad dynamic range is described. This instrument provides transient-concentration measurement capability for many relevant exhaust species includ-

ing total NO_x. In applications for evaluation of NO_x adsorber systems using heavy-duty diesel engines, the instrument revealed relevant emission transients not previously resolved with conventional analyzers. Specifically, the instrument resolved transient emissions associated with the competition between desorption and reduction rates. The instrument's temporal resolution is sufficient to resolve kinetic rates of the NO_x-adsorber system.