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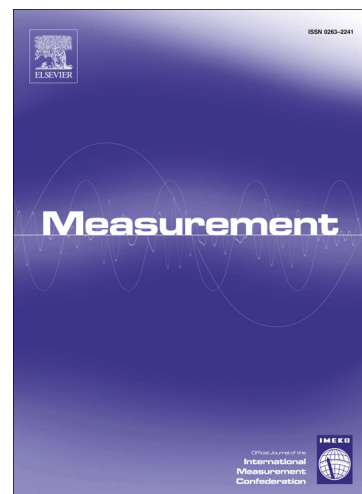
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# Aerosol laser time-of-flight mass spectrometer for the on-line measurement of secondary organic aerosol in smog chamber

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**Abstract:** An aerosol laser time of flight mass spectrometer (ALTOFMS) that can be used for real-time measurement of the size and composition of individual aerosol particles has been designed and utilized to provide on-line measurement of secondary organic aerosol (SOA) particles resulted from Cl-initiated oxidation of toluene in smog chamber. Both the size and chemical compositions of individual aerosol particles were obtained in real-time. According to a large number of single aerosol diameters and mass spectra, the size distribution and chemical composition of aerosol were determined statistically. Experimental results indicate that aerosol particles produced from Cl-initiated oxidation of toluene were predominantly in the form of PM<sub>2.5</sub> particles, and nine positive laser desorption/ionization mass spectra peaks:  $m/z$  18, 29, 30, 44, 46, 52, 65, 77, and 94 may come from the fragment ions of the products of the SOA: aromatic aldehydes, aromatic acids, phenolic compounds, and nitrogenated organic compounds. These results were in good agreement with those ones from previous Cl-initiated oxidation of toluene. These were demonstrated that ALTOFMS is a useful tool to reveal the formation and transformation processes of SOA particles in smog chamber.

**Keywords:** Toluene; secondary organic aerosol (SOA); Laser desorption/ionization;

Aerosol laser time of flight mass spectrometer (ALTOFMS); Appearance probability.

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