

Submicron particulate organic matter in the urban atmosphere: a new method for real-time measurement, molecular-level characterization and source apportionment

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We used a novel chemical analytical method for measuring submicron particulate organic matter in the atmosphere of three European cities (Innsbruck, Lyon, Valencia). Proton-Transfer-Reaction Time-of-Flight Mass Spectrometry (PTR-ToF-MS) was used in combination with the “*chemical analysis of aerosol online*” (CHARON) inlet for detecting particulate organic compounds on-line (i.e. without filter pre-collection), in real-time (1-min time resolution), at ng m^{-3} concentrations, with molecular-level resolution (i.e. obtaining molecular weight and elemental composition information). The CHARON-PTR-ToF-MS system monitored molecular tracers associated with different particle sources including levoglucosan from biomass combustion, PAHs from vehicular traffic, nicotine from cigarette smoking, and monoterpene oxidation products secondarily formed from biogenic emissions. The tracer information was used for interpreting positive matrix factorization (PMF) data which allowed us to apportion the sources of submicron particulate organic matter in the different urban environments.

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