

Time-resolved measurements of organic compounds in particles during heterogeneous reaction of volatile organic compounds with primary and secondary aerosols

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Volatile organic compounds (VOCs) undergo oxidation in the gas phase to yield semi-volatile organic compounds (SVOCs) and secondary organic aerosols (SOAs), which directly and indirectly affect the global climate as well as human health. Quantification of the impacts of SOAs requires understanding their chemical composition and processes of formation as well as mass yields. In particular, because a systematic underestimation of simulated SOA production increases with air mass ageing, speciation of the SVOCs produced by gaseous oxidation is essential. In addition, information about the partitioning of each SVOC between the gaseous and condensed phases as well as the reactions of the condensed SVOCs within the particulate phase is important for the description of SOA formation. Recently, we succeeded in a time-resolved measurement of organic compounds in particles by using proton transfer reaction mass spectrometry. In this study, changes of organic compounds in diesel exhaust particles and SOAs by an addition of some kinds of VOCs through heterogeneous reaction were investigated.

Keywords: Proton transfer reaction-mass spectrometry, Oligomer, Heterogeneous reaction, Secondary organic aerosol, Diesel exhaust particle