



Identification of organic acids in secondary organic aerosols from smog chamber experiments

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The composition of SOA on the molecular level is difficult to analyze, and studies conducted so far were only able to resolve a small fraction of the entire organic particle mass. Many different oxygenated compounds like aldehydes, ketones and organic acids were observed in the particle phase. These measurements of the organic fraction of aerosols have mostly been done by collection of aerosols and their off-line analysis in the laboratory. On-line measurement techniques with a high time resolution are needed to also get a better understanding of the oxidation processes. Recent work has highlighted the importance of oligomeric molecules within SOA. It has been shown that such processes occur in the organic phase on acidic seeds as well as without an acidic seed. The reactions and compounds leading to the oligomers are still not known. It may well be that acids play an important role by being a building block of the oligomers or promoting acid catalyzed reactions leading to their formation.

Air was aspirated through the wet effluent diffusion denuder/aerosol collector (WEDD/AC), a homebuilt instrument for sampling water-soluble gas phase and aerosol compounds. The samples were then analyzed using IC-MS in a quasi-continuous fashion. The MS (MSQ from Dionex) has a single quadrupole mass detector and uses the atmospheric pressure ionization (API) technique, which offers soft ionization resulting in little or no fragmentation. The API source operates using electrospray ionization (ESI).

Studies at the smog chamber were conducted with the precursors 1,3,5-trimethylbenzene (TMB), α -pinene and isoprene. The chamber is a 27 m³ teflon bag which is illuminated with 4 Xenon arc lamps, in order to simulate the solar spectrum. The lights are turned on after the gaseous precursors, a hydrocarbon plus NO_x are equilibrated in the chamber. High amounts of acids have been found for all three pre-

cursors. The contribution of the acids to the aerosol phase is around 50 %. Compounds with high masses of up to m/z 206 for isoprene and m/z 250 for TMB and α -pinene have been found in the gas and particle phase. Earlier studies by us have been done with off-line analysis of TMB experiments, which will be compared to these on-line measurements.