



Gas- and Aerosol chemistry of the isoprene system

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We measured SOA yields from isoprene photooxidation in the PSI smog chamber to be higher than previously reported and also observed SOA formation at lower initial concentrations. Nevertheless, mass yields were still low at 0.2-5% for 200 – 2000 ppb of isoprene.

Results from laser desorption ionization mass spectrometry and volatility tandem differential mobility analyzer measurements suggest that also for the isoprene system oligomerization reactions occur within the aerosol. In order to better understand the chemical mechanism of aerosol growth by the photooxidation of isoprene an extensive characterization of the system was done.

The products of the isoprene photooxidation are comprehensively determined by GCMS, PTRMS and GC-FID-PTRMS measurements. Additionally peroxy radical (HO_2+RO_2) and hydroperoxide (H_2O_2 and ROOH) measurements have been conducted to get an insight into the radical budget of the system and to figure out the role of hydroperoxides on the SOA formation. The results will be used to evaluate the Master Chemical Mechanism.

On-line measurements with a wet effluent diffusion denuder/aerosol collector coupled to IC/MS provides information about the concentration evolution of organic acids in the gas and aerosol phase. Different acids namely formate, acetate, pyruvate, lactate, oxalate and methymaleate have been identified in the gas and aerosol phase. Other acids up to mass 205 were found but couldn't be identified so far.

Additional information about carbonyls in the gas and aerosol phase was obtained

with a filter-denuder setup coated with XAD-4 resin and the derivatizing agent O-(pentafluorobenzyl)-hydroxyl amine (PFBHA). Samples have been analyzed by GCMS. The gas-aerosol partitioning of glyoxal and methylglyoxal was determined.