

The use of the IfT chamber to determine carbonyl compounds from the oxidation of monoterpenes

Ariane Kahnt, Y. Iinuma, O. Böge and H. Herrmann

During the atmospheric degradation of monoterpenes which includes reactions with ozone, OH and NO₃ radicals a number of oxidation products are formed (1). The so called “first generation oxidation products” of monoterpenes are mainly carbonyl compounds which can partition between the gas- and the particle-phases due to their semivolatile nature.

To investigate the processes leading to secondary organic aerosols (SOA) from the first generation oxidation products, chamber studies are a suitable method. Recent aerosol chamber studies at the IfT on this subject will be presented, along with its experimental set-ups and future possibilities. A denuder-filter sampling technique was adapted in order to obtain product distributions in both the gas- and the particle-phases.

To detect both the gas and particle-phase carbonyl compounds using HPLC/DAD and HPLC/ESI-MS, 2,4-dinitrophenylhydrazin (DNPH) was utilised as a derivatisation reagent. The combined use of the sorbent XAD-4 and DNPH on the inner surface of the denuder enables an on-tube derivatisation for the gas-phase carbonyls. In addition, the carbonyl compounds in the particle-phase are sampled on filters and derivatised off-line with the DNPH after the filter extraction. The formed hydrazones were characterised using HPLC/ESI-TOFMS. Here we present the results for the determination of campholenic aldehyde, endolim, nopinon and pinonaldehyde.

(1) Yu, J. Z., et al. (1999), Gas-phase ozone oxidation of monoterpenes: Gaseous and particulate products, *Journal of Atmospheric Chemistry*, 34, 207-258.