

Secondary Organic Aerosol Formation from Ozonolysis of β -pinene

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An important class of Biogenic Volatile Organic Compounds (BVOC) is the monoterpenes ($C_{10}H_{16}$) which are emitted from vegetation, e.g. α -pinene and β -pinene.

Experiments have been performed using a laminar flow reactor and a Scanning Mobility Particle Sizer (SMPS) system, a setup named G-FROST (Göteborg - Flow Reactor for Oxidation Studies at low Temperatures), where resulting particle number (N_{10-300} nm) and mass (M_{10-300} nm) concentrations are obtained as a function of temperature and relative humidity. In addition, the radical chemistry has been investigated using so called OH-scavengers (2-butanol and cyclohexane).

The exocyclic (double bond outside the ring structure) monoterpene β -pinene shows a clear negative response both in mass and number of SOA when increasing the humidity. This is contradictory to the previous findings for ozonolysis of the endocyclic monoterpene α -pinene. These results show that the water effect can be both positive and negative for different monoterpenes, even between compounds with minor changes in chemical structure. The use of 2-butanol and cyclohexane as OH-scavengers reduce produced SOA from ozonolysis of β -pinene where 2-butanol reduce more than cyclohexane.

Suggested reading

Johnsson, D and Marston G.; Chem. Soc. Rev., 37, 699-716, 2008

Jonsson, Å. M. et al.: Environ. Sci. Technol., 40, 188-194, 2006