Atmos. Chem. Phys. Discuss., 7, S7725–S7726, 2007
www.atmos-chem-phys-discuss.net/7/S7725/2007/
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Particle mass yield in secondary organic aerosol formed by the dark ozonolysis of α-pinene" *by* J. E. Shilling et al.

A. Chan

achan@caltech.edu

Received and published: 18 December 2007

We have recently performed two chamber experiments of dark ozonolysis of α-pinene at low total aerosol loading in the Caltech smog chamber. Experiments were carried out at 293K and RH < 7%. After adjusting for temperature effects, the yields we obtained are consistent (within uncertainty) with those obtained in this work and in Griffin et al. (1999).

A value of 100 kJ/mol was used for the enthalpy of vaporization in correcting the yields for temperatures. The yield for the seeded experiment is consistent with the fit obtained in Griffin et al. (1999) for a temperature of 293K (see link below). An induction period was observed in the nucleation experiment, which likely contributed to loss of semivolatile compound and the lower yield observed (Kroll et al., 2007).

In this work, the yields obtained at lower organic loading ($< 10\ \mu g/m^3$) were shown to be higher than literature values. However, the fit obtained in Griffin et al. (1999) when adjusted to 298K and the fit obtained in this work lie on top of each other between 3 and $10\ \mu g/m^3$ (see link below). Since the current CIT data adhere to the fit in Griffin et al. (1999) at 293K, it can be inferred that the yields obtained for dark α-pinene ozonolysis at the Caltech chamber and at the Harvard chamber are consistent at aerosol loadings between 3 and $10\ \mu g/m^3$.

Click on link to see figure: http://www.its.caltech.edu/%7Eachan/apO3data.gif

Current CIT data:
1. Nucleation: SOA volume $= 3.34 \pm 0.06\ \mu m^3/cm^3$ Y $= 0.11 \pm 0.01$
2. Ammonium sulfate seed: SOA volume $= 5.0 \pm 0.4\ \mu m^3/cm^3$ Y $= 0.16 \pm 0.01$

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17927, 2007.