

***Interactive comment on “Analysis of the
hygroscopic and volatile properties of ammonium
sulphate seeded and un-seeded SOA particles” by
N. K. Meyer et al.***

Anonymous Referee #2

Received and published: 21 July 2008

General comments

The article presents a detailed analysis of hygroscopicity and volatility measurements of secondary organic aerosol from alpha-pinene oxidation products in an environmental chamber. For the first time organic compounds are shown to increase hygroscopicity of ammonium sulphate particles in relative humidity below their deliquescence relative humidity. The article is scientifically relevant and well written and should be considered to be accepted for publication in Atmospheric Chemistry and Physics after considering the comments presented below.

Specific comments

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Electrosprayed ammonium sulphate seed particles are used in this study. Is the SMPS able to determine reliably such a narrow distribution and determine the width of the generated distribution?

Kelvin effect is taken into account in various calculations presented in the article. How is the surface tension and density of the particle estimated in a case of seeded experiments, when the particles are by definition composed of both inorganic and organic constituents?

Hygroscopicity of the un-seeded experiments are not discussed and no data is shown. E.g. Fig 5 includes a line corresponding to HGF of pure SOA particles, which is scaled to mode diameter. Please provide more details on the scaling.

VH-TDMA analysis is conducted for the particles 5 hrs after the start of the illumination. The authors state that the condensation processes have ceased by this time. However, according to Fig 1, the mode grows still grows in a considerable rate, which I suspect to be faster than coagulation alone. The authors should present total number concentrations in Figure 1 to give the reader an idea about the role of coagulation in the growth. What is the role of apparent growth due to size dependent wall losses?

The SOA mass concentration from the AMS (Fig 2) seems to level off after 5 hrs, but how much could this be attributed to the methods used to calculate mass concentration from the AMS spectrum (and possibly neglecting organo-sulphates)?

pp. 8635:

Please include time resolution of all the instruments used in the study.

Type of Vaisala RH-probes?

Last sentence: add reference to the VH-TDMA setup.

What were the dry sizes of the VH-TDMA setup? Were they varied as the mode grew during the experiments?

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pp. 8636 paragraph 1. Wall losses affect the size distribution always, not only after 5 hrs as the authors state.

pp. 8641 paragraph 2: I don't understand percentile values calculated from the size distribution.

Figure 1 should include total number concentration along with the size distribution evolution.

Technical comments:

pp. 8642 paragraph 2 line 26, This indicates... pp. 8643 paragraph 3: H-classifier? pp. 8646 paragraph 2, Use different expression for the SOA coatings in sentence 2.

Legend boxes extend onto the axis in Figures 5, 6 and 7.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 8629, 2008.

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