

Interactive comment on “CCN activity and droplet growth kinetics of fresh and aged monoterpene secondary organic aerosol” by G. J. Engelhart et al.

G. J. Engelhart et al.

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(1) Referee: *Abstract, Last sentence: Do you mean SOA has only a surface tension of 10 to 15 percent of water. I guess it has one that is 10 to 15 percent reduced in comparison to water.*

Response: The simple Koehler theory model predicts CCN activation diameters that are within 10-15 percent of the measurements. This was unclear and has been corrected.

(2) Introduction, First paragraph: *I would say "...many questions still remain about the influence of organic particle material on..."*

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We have made the suggested change.

(3) *Fourth paragraph: I would say "...the alpha-pinene SOA was, or SOA particles were..."*

Corrected as noted.

(4) *Fifth paragraph: I would say "...the alpha-pinene SOA was, or SOA particles were..."*

Corrected as noted.

(5) *Please shorten the introduction (especially paragraph four and five) and focus on the main points. a. Role of monoterpene SOA. b. What has been done before (literature)? c. What is new? You should not state measurement results from other studies in detail. You can compare your results with these findings later in the manuscript.*

In order to address the comments by both reviewers we have revised the last part of the introduction focusing on the above points. The quantitative discussion has been removed from the introduction.

(6) *Experimental Methods First paragraph: What were the temperature and RH values in the chamber? Please provide information here.*

The information about the relative humidity values was moved from paragraph 2 to paragraph 1 together with the chamber temperature.

(7) *Second paragraph: "...particle number size distribution..."*

Amended.

(8) *Comparison of CCN instrumentation First paragraph: What about doubly charged*

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particles leaving the DMA. Do you consider them and how do you treat them as they should appear in the CCN counter as "early activated guys"?

A brief description of this point has been added to the paper. The sigmoidal fit for the DMT CCN counter is only conducted on the particles above the early activation hump, which can be attributed to the multiply charged particles exiting the DMA and entering the CCN counter and the CPC. This is apparent in Figure 2 as the fit drops off to zero rather than following the multiply charge early activators. Please note that the overall effect is small given the small size of the particles used in this work.

(9) *Second paragraph: How long does one chamber experiment take?*

Experiments vary in length based upon the number of particles generated in the nucleation event, the flow of instrument and filters sampling from the chamber and the goals of the experiment. We now explain that the typical experiment lasts 5-10 hours. This is also shown in a few of the figures.

(10) *Third paragraph: This belongs into the section of experimental methods and partly was already stated there.*

The description of the DMT CCN counter has been expanded in the experimental section and removed from the results section.

(11) *Fourth paragraph: Please give possible reasons for your finding of deviations between the two CCN counters. Is it because they are based on different principles?*

We have added a short discussion of the reasons for the potential deviation including the difference in measurement timescales, operating temperatures and the usual experimental differences between two different instruments.

(12) *I would put this section "Comparison of CCN instrumentation" as a subsection in*

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Experimental Methods. Please see it as a proposal.

This has been moved to the experimental methods section, which was then broken into subsections for clarity and emphasis on the use of two distinct CCN measurement tools.

(13) *Aging of SOA Particles First / Second paragraph: I would put in here a theoretical curve with a surface tension smaller than that of water because I expect a reduction of surface tension compared to water when investigating SOA particles.*

The measured surface tension reduction is discussed in section 3.4. Here we use a priori knowledge of SOA coupled with a simple version of Koehler theory (as described in section 4) to give an expected theoretical line to guide the eye, noted in the manuscript as for reference.

(14) *4. Parameterization using classical Koehler theory. Second paragraph: "...at different combinations..." Could you earlier in the manuscript state the uncertainty of your CCN measurements.*

In the experimental section we have added a description of inherent instrument uncertainty as well as a description of the calculation of reported error for the static CCN counter activation diameters.

(15) *5 Conclusions First paragraph: "...alpha-pinene..."*

Corrected.

(16) *Figure 2: Please put the description of symbols into a legend on the plot.*

This is now included in the lower right hand corner of the figure.

(17) *Figure 5: Please list the participating chemical components in the figure caption.*

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This list has been added.

(18) *Figure 7: Again, please put in additional lines for lower surface tension and try to use a better scaling with larger symbols.*

Figure 7 has been redone with larger symbols and a different scaling. We hope that placing the data on logarithmic axes will also aid the reader in understanding the data.

(19) *Figure 9: Again, please put the description of symbols into a legend on the plot.*

The symbols have been moved from below the figure to the lower right hand corner of the figure.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 95, 2008.

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