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Interactive comment on "Hygroscopicity of secondary organic aerosols formed by oxidation of cycloalkenes, monoterpenes, sesquiterpenes, and related compounds" *by* V. Varutbangkul et al.

Anonymous Referee #2

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Interactive comment on "Hygroscopicity of secondary organic aerosols formed by oxidation of cycloalkenes, monoterpenes, sesquiterpenes, and related compounds" by Varutbangkul et al.

This manuscript presents large laboratory study focusing on the hygroscopic properties of key organic compounds of atmospheric relevance. The data are unique, it presents growth factors and their time development in chamber conditions. This a good manuscript and should be published in ACP after considering the minor questions below.

Main comment

The literature data of HTDMA is usually difficult to compare with each other as the details of the instrument setup are different and often not explained in detail. One of the important information is the uncertainty of the observed values. The authors give the uncertainty in GF of +/- 0.01. This is very good value and better than most of the reported values. However, there is not really possibility for a reader to understand how this value was obtained. I would like to recommend that a separate paragraph or section is added summarising the QC/QA issues and discussing the background of the concluded uncertainty.

Other comments

The experiments with seed aerosol (ammonium sulphate) need somewhat more explanation. The generated aerosol, if I understood correctly is polydisperse, generated using an atomiser. This will naturally influence the fractionated composition during condensation of organics. This could be more specifically pointed out. The width of the size distribution should be given.

Section 2.1.2. The RH history of the ammonium sulphate particles remains unclear. The aerosol is generated evaporating water form solution droplets. However, if the RH goes below 40% or so the particles will crystallise and would not form droplets at 50% again. I assume that this might be a risk as the atomiser uses typically dried compressed air to spray the droplets.

The experiments with SOA formation on inorganic seed aerosol (3.1.1.) show bimodal growth distribution. I wonder if there is any possibility that there is also SOA nucleation within the chamber leading to pure SOA particles together with mixed particles due to condensation on to the seed aerosol.

Section 3.2.2. What is meant by “The HTDMA is operated in the drying mode”?

Fig 5: Original dry diameter should be given in the figure caption. This figure shows a

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nucleation experiment. It would be interesting to see also the evolution of the aerosol mode (diameter) and the total number concentration, perhaps plotted in the same figure.

Figure 6: What is the time scale of doing all these experimental points (how long does it take to make one scan)? Can we assume that the aerosol composition stays constant during the whole experiment?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 1121, 2006.