

Interactive comment on “CCN activity of aliphatic amine secondary aerosol” by X. Tang et al.

Anonymous Referee #1

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The manuscript presents results from chamber experiments where the hygroscopicity of particles formed from amine oxidation products is studied. Lately the role of amines in the formation of SOA has been acknowledged and here new results are presented on the hygroscopicity of these products. Also important is the increasing knowledge of the semivolatile SOA and how they are affecting the CCN measurements. Thus the topic is important and of interest for ACP readers. I have only few comments, and after addressing them I recommend the manuscript to be published in ACP.

Specific comments

Abstract: Abstract is quite long and heavy to follow with lot of results. It could be improved by emphasizing more the main findings and leaving out some less important details.

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Abstract: “The aerosol behaves non-ideally, hence simple ZSR rules cannot be applied to the CCN results from the primary aliphatic amine system”. What you mean by non-ideal aerosol? If aerosol is semivolatile it does not make it non ideal, and it is more measurement issue that ZSR is not working.

In the introduction the atmospheric relevance of amines is only shortly mentioned without really discussing how important they are. How big fraction of all organics is made of amines? How are they distributed in the atmosphere and what are the sources?

Page 35, line 16: How atmospherically relevant are the measurements conducted at RH less than 0.1%?

Methods: The precursor concentrations used in the experiments are quite high. Could it be that semivolatiles already evaporate when they are classified in the DMA and this could affect the results?

Page 41: How is ammonia formed?

Page 42: “Therefore, there are likely differences in the aerosol solute composition measured at high and low ss.” What if there are just differences in the aerosol evaporation rate or even morphology?

Page 42: Only the top and bottom temperatures are presented for CCN-column. It would be also interesting to know how high the temperature was before particles are activated to cloud droplets. I assume that drops will not evaporate after the activation if supersaturation is maintained in the chamber. Is the position of maximum supersaturation dependent on the flow and temperature gradient in the DMT CCN column? What is the relative humidity of sample air arriving into the CCN column and what is the relative humidity that sample experiences as a function of time? Now it is difficult to make a connection between results in Figures 3 and 4.

Table 1: What is the hygroscopicity of ammonium nitrate based on your experiments (on Page 43, line 7)? Do you see evaporation of nitrate and ammonia?

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Table 1: There is a big difference between TMA HNO₃ and BA HNO₃ hygroscopicities (0.72 and 0.52). What is causing that? Compared to ammonium nitrate the hygroscopicity of TMA HNO₃ seems to be quite high.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 31, 2014.