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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Electrical charging changes the composition of sulfuric acid-ammonia/dimethylamine clusters" *by* I. K. Ortega et al.

Anonymous Referee #1

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The work presented in the paper is rather thin, amounting to calculating evaporation rates from already published calculations. There needs to be an actual application and comparison to experiment (and here they should discuss what was already done in the Faraday transactions work.) They should apply their proposed methodology (as in the very last paragraph) to neutral cluster determinations in the literature, one possibility is the original cluster work from Eisele and Hanson. They should also compare and contrast with the Zhao et al. detection of neutral clusters in the atmosphere. Finally, there should be a section on complications that addresses the following two items: (i) Clusters will be in the presence of relatively large amounts of water vapor. Neutrals

will likely have several water molecules, and the authors could present calculations on the water content of ions and whether water has a stabilizing effect. (ii) The charging process itself. Common reagent ions for neutral cluster detection are HNO3.NO3- and H3O+.(H2O)_5,6. In the case of the former, charging may involve leaving behind an HNO3 ligand which may help to stabilize clusters. In either case, there is usually some heat from the reaction that will increase evaporation rates.

The first paragraph of the results is actually a repeat of the methods ?...? Table 2a and b are not that helpful. Figures 5 and 6 are poorly discussed and the captions could be tightened up. I did not get much from these figures.... Figure 4 could have the protonated H2SO4 clusters included and of course water would be needed. In addition, Froyd and Lovejoy have benchmark data with which to compare that would really bolster that section of the paper. Figure 3 should have the experimental evaporation rates of neutral H2SO4 clusters but in the presence of water vapor. H2SO4 evaporation rates will drop substantially.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 1317, 2014.