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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Amine exchange into ammonium bisulfate and ammonium nitrate nuclei" *by* B. R. Bzdek et al.

Anonymous Referee #3

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This paper is about kinetics and thermodynamics of substitution of ammonium bisulfate/ammonium nitrate clusters (1-2 nm) by amines as well as aminium bisulfate/aminium nitrate by ammonia. The authors state that the former substitution was almost absolute (within a few seconds to a few minutes) while none happened in case of the latter. The implication being that amines rather ammonia may be components of new particle, even in cases where ammonium salts formed at first. This is definitely an important addition to the field as amines have been quoted severally as potential candidates for NPF. The experiments were carefully conducted and the contents are within the scope of ACP. It should therefore be published in ACP. I have two suggestions and one minor comment.

First, whereas the focus of the paper is on salt cluster substitutions, there is evidence

that amines can form particles via secondary organic chemistry (e.g. Silva et al 2008; De Haan et al 2009). I am suggesting that the authors mention this in the introduction.

Secondly, it may be helpful if the authors stated why they chose methylamines for this study, especially given the fact that there are other classes of amines that have been detected in particles such as ethylamines (e.g. Sorooshian, 2008).

Finally, equations 7 and 8 have K italicized whereas and in Table 1 column 4, they are not. If they represent the same parameter, then keep the style consistent. It may be confusing because K has also been used for temperature on page 54 line 10.

References:

De Haan, D. O., Tolbert, M. A., Jimenez, J. L.: Atmospheric condensed-phase reactions of glyoxal with methylamine, Geophys. Res. Lett., 2009

Silva, P. J., Erupe, M. E., Price, D., Elias, J., Malloy, Q. G. J., Li, Q., Warren, B., Cocker, D. R.: Trimethylamine as precursor to secondary organic aerosol formation via nitrate radical reaction in the atmosphere, Environ. Sci. Technol., 2008

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 45, 2010.