

Interactive
Comment

Interactive comment on “Amines are likely to enhance neutral and ion-induced sulfuric acid-water nucleation in the atmosphere more effectively than ammonia” by T. Kurtén et al.

Anonymous Referee #2

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General comments:

The authors are presenting a very nice idea, the effective enhancement of sulphuric acid / water nucleation by amines. This concept can help to resolve the discrepancies between nucleation experiments from lab and atmospheric observations. Personally, I think it is amazing to see the deduced relative stabilities of H₂SO₄/amine clusters regarding the corresponding ammonia clusters. This paper is well written, also for someone who is not so familiar with ab initio methods. Few minor changes could improve the significance of this paper.

Specific comments:

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Interactive Discussion

Discussion Paper

1) The authors argue that amines can work much more efficient in the process of new particle formation than ammonia. In the last decade ammonia is believed to act as a possible third body in sulphuric acid / water nucleation. So it would be helpful to have a more detailed state-of-the-art assessment regarding the role of ammonia from lab and field observations as well as from theoretical approaches. The study of Ball et al. (1999) provides few data for neutral nucleation measured under dry conditions, other results are given e.g. by Kim et al. (Aerosol Science & Technology, 1998). Field data are available e.g. from the Atlanta experiment given by McMurry et al. (JGR, 2005). What are the "varying predictions" from theoretical studies, p.7457, l.1?

2) Data for atmospheric amine concentrations should be added, see e.g. Moiser et al. (ES&T, 1973).

3) In Kulmala et al. (Science, 2007) the occurrence of a stable number of 1.5-1.8 nm neutral clusters is reported. Can these clusters consist of amine adducts rather than ammonia adducts? Is it possible to give a rough estimate?

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 7455, 2008.

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