

Interactive comment on “Heterogeneous uptake of ammonia and dimethylamine into sulfuric and oxalic acid particles” by Meike Sauerwein and Chak Keung Chan

Anonymous Referee #2

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The manuscript by Sauerwein and Chan describes results of laboratory experiments to investigate the competitive uptake of ammonia and amines in acidic particles. Experiments were conducted using dimethylamine as the representative alkyl amine and sulfuric or oxalic acid particles, at varying molar ratios of gas-phase amine/ammonia and varying relative humidities. Particulate aminium and ammonium molar ratios were measured by extraction followed by ion chromatography. The studies demonstrated uptake was influenced by the extent of neutralization and by the phase state of the particles. Some of the strengths of this work are that the experimental design considered: 1) co-uptake of ammonia and dimethylamine, 2) a range of relative humidities, and 3) a range of particle acidities. One weakness of this work was the use of large

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particle sizes, though the reasons/limitations are clearly acknowledged and the results will nonetheless be useful to the community. One of the interesting findings was the influence of phase state on co-uptake and the effect of DMA/DMAH in limiting crystallization. The methodology and results were presented clearly, leaving no technical comments to be addressed. It is recommended that the minor editorial comments provided be addressed prior to publication.

Editorial Comments p2, line 10: The phrase “highest in marine particles as well as urban and rural aerosols” is confusing. It is not clear whether the authors are highlighting the importance of alkylammonium ions in marine aerosols, or the 140-560 nm size range.

p2, line 28: Do the particles actually absorb more water than ammonium sulfate particles across different compositions and sizes? Or are there some limits (e.g., only below the deliquescence point of ammonium sulfate)?

p3, line 30: Are the first experimental parameters for the sulfuric acid particles? If so, may want to specify that.

p6, line 4: Add ‘2-’ to SO₄ (as appears later in Section 3.2).

p6, section 3.2: Check section numbers here and throughout.

Section 3.2: NH₃ displaced DMAH. . .should this be NH₄? And then in paragraph below NH₄ displaced by DMA. . .should be DMAH? Recommended to check throughout. Also recommended to check notation such as NH₄ vs. NH₄⁺, which appears to be used inconsistently.

p8, line 40: “During the”

Table 1: The subscript on the N looks like a superscript.

Fig. 2: x-axis font in panel b appears larger than in other panels. Some other inconsistencies between panels-recommended to check closely.

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