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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemical ionization of clusters formed from sulfuric acid and dimethylamine or diamines" *by* Coty N. Jen et al.

Anonymous Referee #2

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This paper reports interesting experimental work on the behaviour of atmopsherically relevant cluster upon charging and subsequent travel though mass spectomteric instruments. The data has been analysed with ma modelling scheme, and result help to understand state of the art instruments in the field of atmospheric particle ormation as well as the formation process itself.

On top of the issues raised by the other two anonymous referees, I have only a few minor points that the authors could consider clarifyin:

Lines 32 &46: "...its clusters react with other trace compounds to produce stable electrically neutral ..." Is the idea here that the clusters are formed of sulphuric acid and water only, and the other compounds are added in the reactions mentioned? This could be specified, as now speaking of clusters existing before the reactions with trace

compounds sound a bit confusing

Line 55 Maybe add "that of" in the sentence "... proton affinity than THAT OF acetate..."

Line 236 Might be better to change "Following the neutral reactions . . . "-> "Following the neutral clustering reactions—"

Lines 343-348: "For all three diamines, we were unable to reproduce the observations with other combinations of Âăreactions and evaporation rates. The model only matched the observed trends when turning off the CI or formation of A2*diamine2.

Other explanations may exist to explain the differences between DMA and diamines observations (the most likely being semi-efficient [NITRATE?] CI of A2*diamine instead of zero nitrate CI of A2*diamine2), but additional thermochemical data (e.g., from more targeted experiments and computational chemistry) are needed to better inform the model. "

The explanation above feels slightly confusing as it seems that first it is stated that no other choice would lead to the observed trends, but then later another possibility is suggested. Could this be clarified? And could the word nitrate be added where I have inserted it in brackets in the above text?

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