

Interactive comment on “Hygroscopic Properties of Aminium Sulphate Aerosols” by Grazia Rovelli et al.

Anonymous Referee #3

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In this paper Grazia et al. describe the use of a Comparative Kinetic Electrodynamic Balance for investigation of the hygroscopic properties of Aminium Sulfate aerosols in comparison with water and Sodium Chloride solution drops with the same system and data collected by a number of other studies and methods. The experiments presented within are well thought out, the uncertainties in the data have been well investigated, and the results thoroughly compared with previous data. However, I feel the tie to atmospheric chemistry, although present, is lacking. To be accepted for publication the authors should present more of a link to atmospheric processes and clearer indications of where this data this data will be most useful.

Below are more detailed comments on the manuscript.

Page 2 line 30: Rework the sentence starting with ‘Their ambient conditions ...’

C1

Introduction overall: This is meant to bring everyone up to speed but I found it lacking. Consider including more information on atmospheric relevance, in situ particle formation, etc. For instance your mention of aminium sulfates role in cloud particle nucleation seems forced. If you go to the Lavi et al. paper you find right in their abstract that “Alkyl aminium sulfates have been postulated to constitute important components of nucleation and accumulation mode atmospheric aerosols.” and “We infer that these species have very high CCN activity ...”

Page 4 Line 6: It would be of benefit to the reader if a diagram of the EDB were included in the paper.

Page 4 line 16: How are you controlling the RH?

Page 4 line 22: You never explicitly state the range of RH and temperatures you are conducting your experiments at, over. Please include for completeness and link to atmospherically relevant conditions.

Page 4 line 26: You mention it once (on the noted line) but I think it would help to clarify that your droplets are alternately injected into the system as it is possible to have multiple particles or drops trapped in an EDB simultaneously. One question I had – You’re residence timescale for a single particles is less than 30 s so the RH it is exposed to is arguably constant, but to what degree does the RH change over the course of the 10+ particle runs?

Page 8 line 13: I’ve seen this throughout the paper: ‘... estimated by Qiu and Zhang (2012) (Qiu and Zhang, 2012) is ...’ You have essentially cited the paper twice and the second citation should be removed. Other instances can be found on page 3 line 3 and page 15 line 29. There may be others I missed.

Page 12 line 19: I think this is the first time you introduce ZSR, make this acronym explicit in line 16 where you introduce Zdanovskii-Stokes-Robinson expression.

Page 15 line 22: Quantify fine variations.

C2

Page 16 last paragraph: This doesn't seem to fit. Your previous paragraph starts with 'As a final remark ...' then this is thrown in. This goes back to my main issue of making the paper more atmospherically relevant.

Figure 4: You can remove legend from caption text.

Figures 5 & 6: Consider labeling your subplots a-f as done in other multi-plot figures.

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