

Atmos. Meas. Tech. Discuss., referee comment RC1
<https://doi.org/10.5194/amt-2021-108-RC1>, 2021
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Comment on amt-2021-108

Anonymous Referee #1

Referee comment on "A dual-droplet approach for measuring the hygroscopicity of aqueous aerosol" by Jack M. Choczynski et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-108-RC1>, 2021

Review of "A Dual-Droplet Approach for Measuring the Hygroscopicity of Aqueous Aerosol" by Choczynski et al.

The authors presented a linear quadrupole electrodynamic balance (LQ-EDB) method for levitation of dual droplets that can be used for accurate measurement of hygroscopicity of aerosol particles. By using NaCl and LiCl as probe droplets, the range of accurate relative humidity (RH) determination was extended compared to the previous version. The improved technique was applied to study particles containing viscous species and volatile ones, demonstrating its abilities to investigate particles of kinetic limitations and evaporative loss. The experimental setup is well designed and implemented, with great details provided. The experimental results of a few atmospherically relevant species are also clearly presented, backed by literature data and/or thermodynamic model results. The manuscript is generally well written, but I found some places difficult to follow (some examples in technical comments). I therefore recommend publication of this manuscript after Minor Revision. My comments, as shown below, are rather minor too.

Minor comments:

- Section 3.2. It would be helpful to have a schematic or table to show how these three methods to obtain dry size differ, aiding the description here.

- L142: Why a lower temperature in the chamber than the ambient temperature can

avoid condensation in the tubing? Should it be easier to have condensation for a hotter air stream going to a colder region?

- Is a standalone Section 5 of Conclusions necessary? Can it be merged into Section 4 as "Conclusions and Implications"?

Technical comments:

- P3/L72: is it "sample droplet" or "probe droplet" that was used to infer water activity?
- P5/L166: "using" to "used"?
- P6/L180: what are "these" referring to? Same in L246.
- P6/L186: please delete "Cotterell et al.," in the citation. Same in L210.
- P6/L195: ammonium sulfate is indeed one of the most important (and abundant) inorganic components. But it would be inaccurate to say that it is the most abundant salt in the atmosphere, since global estimate suggested that sea salt, which contain mostly sodium chloride, would have a higher burden (a factor of 3 – 4) than that of

