

Interactive comment on “Results and recommendations from an intercomparison of six Hygroscopicity-TDMA systems” by A. Massling et al.

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Specific comments

Reviewer comment: Section 4.2.1, Section 4.2.3, and second column of Table 3 The authors should replace subscript “theo” next to RH in section 4.2.1, next to GF in section 4.2.3, and in the header for the second column of Table 3 with subscript “expected” (or another subscript with a similar meaning). These are not theoretical values; these are values expected based on the trusted results of previous measurements.

Author comment: We agree on this comment for both sections. In 4.3.1 the RH(theo) is actually based on the measured growth factor and experimental results on the growth
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of ammonium sulfate published by other authors. Also, values given for DRH are based on experimental results. We will replace the index by something more suitable in this context.

Reviewer comment: Section 4.1: I would add frequent (daily) verification of the sheath flow and aerosol flow in both DMA columns to the list of recommendations. In my experience, flows deviate from their target values much more frequently than rod high voltages do.

Author comment: We completely agree on this comment as we consider the flow uncertainty to be a major reason for the inconsistencies we found during our experiments. In a revised version of the manuscript, your recommendations will be included.

Reviewer comment: Section 4.2: The authors should emphasize the importance of keeping DMA columns clean, especially from semi-volatile organic contamination. Such contamination present in DMAs or in the conditioning section can lead to the adsorption of surface active organics on the particles and changing the growth factor and/or DRH. The effect of surface-active organic contaminants on the measured DRH values of pure compounds can be quite significant (several DRH % units) for small particles. For example, attempting to do a HTDMA measurement on inorganic particles of NaCl after using the system with organic aerosols, can lead to unreliable results without through cleaning.

Author comment: A paragraph hinting to this cleaning recommendation will be included in a revised version of the manuscript in section 4.2. The authors were not aware that semi-volatile organic contamination could have such strong effect on measurements. In any case, we think it is valuable to emphasize that a cleaning of the DMA columns is needed after DMAs are used for certain investigations within laboratory experiments as usually concentrations in such studies are extremely high.

Technical corrections

Reviewer comment: Section 4.2.3, page 649, line 23: this should refer to Fig. 5, not to Fig. 6

Author comment: This is right and will be changed in a revised version of the manuscript.

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