

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

### **Anonymous Referee #1**

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#### General comments

This manuscript describes an intercomparison study between six different HTDMA (hygroscopicity tandem differential mobility analyzer) systems, designed to quantify hygroscopic properties of aerosol particles. This is a useful manuscript for two reasons. First, there is no unified way for acquiring and analyzing HTDMA data, even though the technique has existed for a number of years. The guidelines presented in this manuscript should make it possible to more easily compare data from different custom-built HTDMA systems. Second, the manuscript describes common technical issues that can be encountered in hygroscopic growth measurements with HTDMA. While most of them

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(such as keeping the temperature constant, calibrating the RH probes, calibrating the system with respect to well studied particles, etc.) are familiar to users of HTDMA instruments, the new users may not be aware of them.

#### Specific comments

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.

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.

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.

#### Technical corrections

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

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