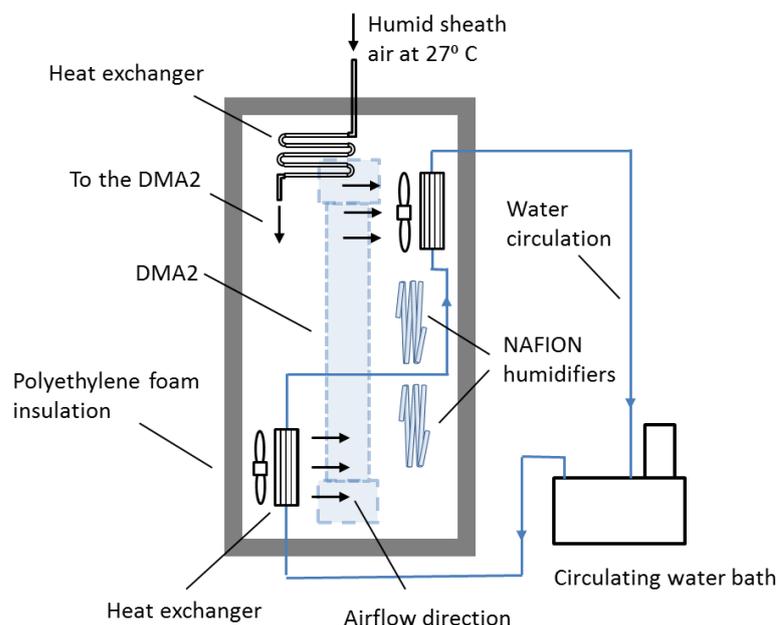


1 **Supplementary material**

2 **S.1 HHTDMA setup.**

3



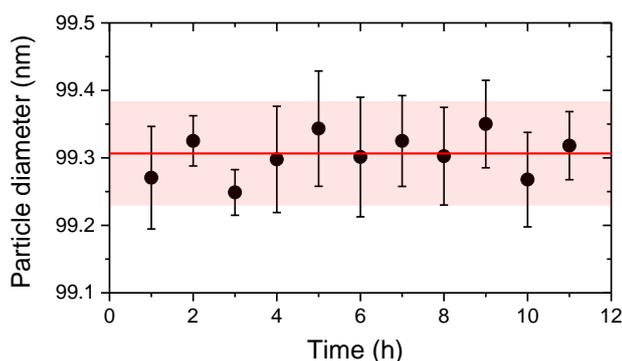
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6 **Figure S1.1** Schematic diagram of the temperature-controlled DMA2 box.

7 The temperature difference between the sheath and excess flow can be changed by adjusting the
8 rotation speed of the fans.

9

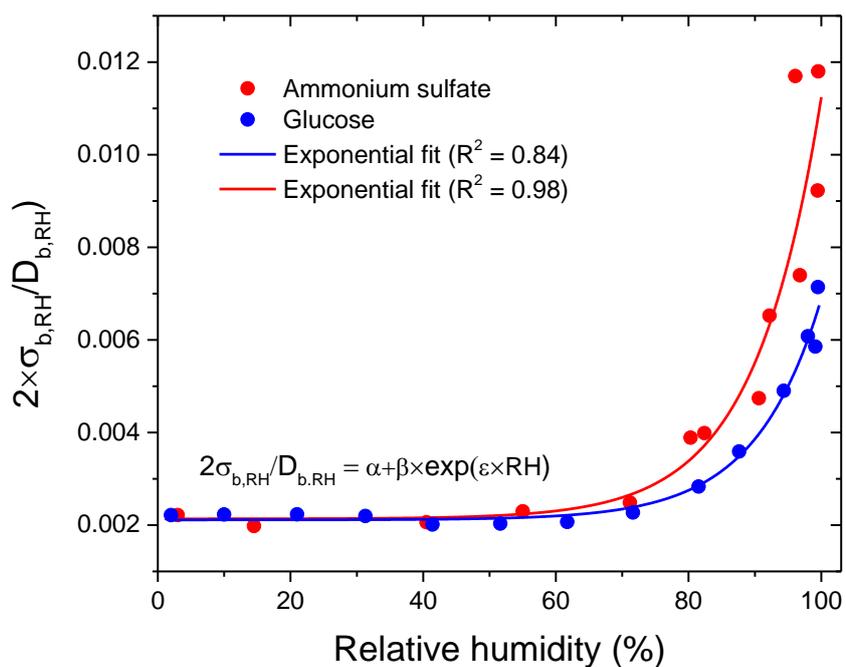


10

11 **Figure S1.2.** Dry particle stability characterized by test measurement of initial mobility diameter
12 ($D_{b,i}$) as selected with DMA1 and measured with DMA2 for ammonium sulfate particles over the
13 full duration of an H-TDMA experiment (~10 h). Symbols and error bars represent the mean
14 ± 2 standard deviation (σ) of five-seven repeated measurements. Red line and fill area are the
15 average of the all -76 data points $\pm 2\sigma$, respectively.

16

17



18

19 **Fig. S1.3** Relative uncertainty ($2\sigma_{b,RH}/D_{b,RH}$) of DMA-2 measured mobility diameters as function
 20 of relative humidity and corresponding exponential fitting curves.

21 The best fitting parameters of exponential function for ammonium sulfate (AS) and glucose (GI)
 22 aerosol particles are $\alpha_{AS} = 0.0021$; $\beta_{AS} = 4.4391 \cdot 10^{-7}$; $\varepsilon_{AS} = 0.0993$ and $\alpha_{GI} = 0.0021$; $\beta_{GI} =$
 23 $2.0508 \cdot 10^{-7}$; $\varepsilon_{GI} = 0.1006$, respectively.