Electronic Supplementary Material (ESI) for Environmental Science: Processes & Impacts.

Supplemental Information:

Hygroscopicity of Nitrogen Containing Organic Carbon Compounds: *o*-aminophenol and *p*-aminophenol

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Summary: This supplemental document includes the relative humidity determination of the H-TDMA setup, the size selectivity validation, the supersaturation calibration data for the CCNC using ammonium sulfate as the standard, and TEM images obtained for *o*-aminophenol and *p*-aminophenol at small and large size particles.

H-TDMA Growth Factor Calibration

The H-TDMA relative humidity was determined using ammonium sulfate. The experimental growth factor of ammonium sulfate was calculated by dividing the geometric mean wet particle diameter by the selected dry particle diameter (**Figure S1**). Using the growth factor and the known κ-hygroscopicity of ammonium sulfate, the relative humidity (RH) within the H-TDMA setup was determined from Taylor et al (2011). [1]

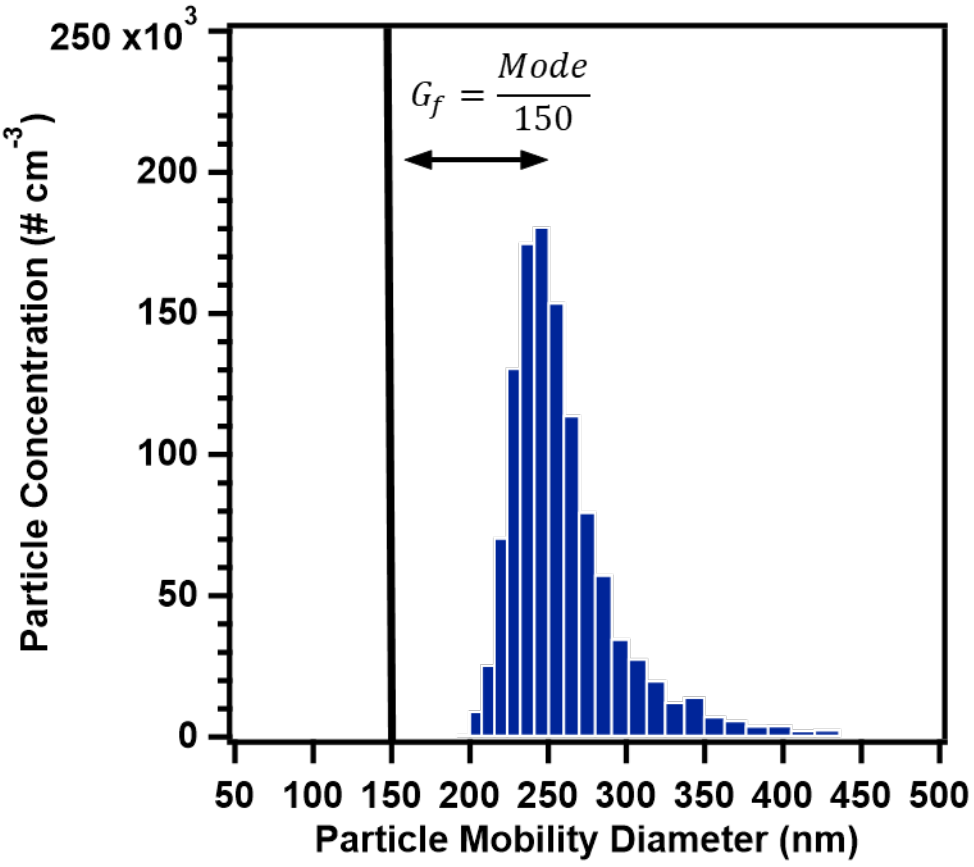

Figure S1. A sample H-TDMA run showing growth factor determination of ammonium sulfate (sheath flow = 3.0 L min^{-1}; aerosol flow = 0.3 L min^{-1}). Straight line represents the selected dry particle diameter, while the particle mobility diameter size distribution represents aerosol sizes post humidification. The growth factor was calculated from the mode obtained from the size distribution and the selected dry diameter size (150 nm).

H-TDMA Size Selectivity

The size selectivity of the H-TDMA setup was validated using a Scanning Mobility Particle Sizer (SMPS; consisting of DMA2 and CPC) connected downstream from the Differential Mobility Analyzer (DMA 1)—where particles are size selected (**Figure S2**). Ammonium sulfate was atomized, and size selected at 50 nm using DMA 1. The SMPS, downstream, from DMA 1, measures the aerosol particles as shown in **Figure S3**.

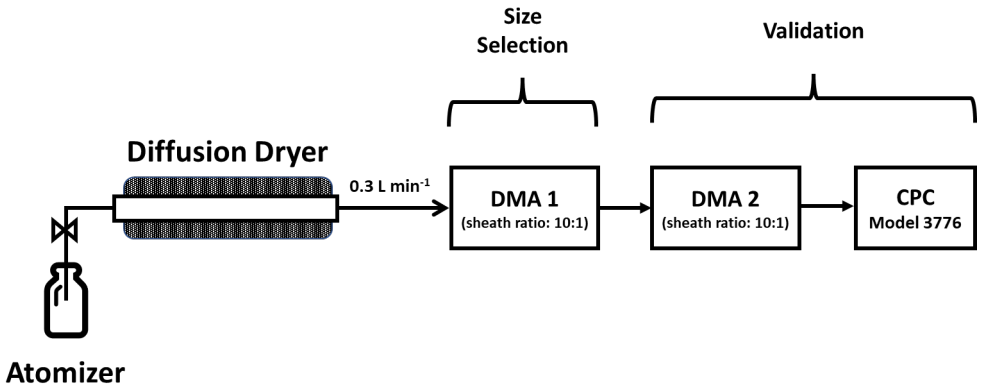

Figure S2. Experimental setup to validate the size selectivity of the DMA.

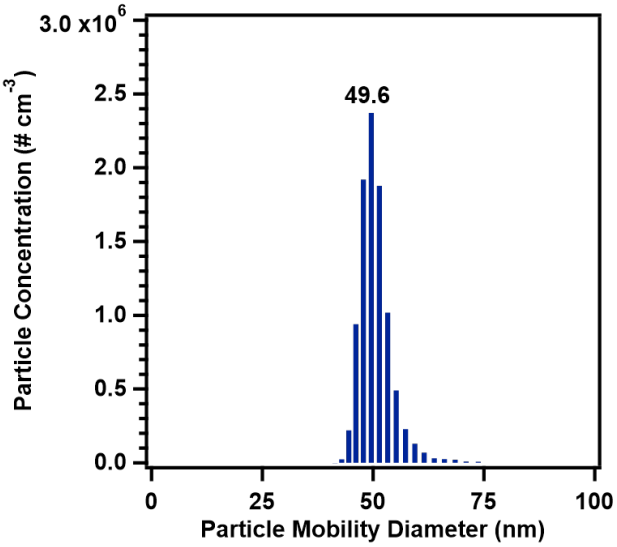

Figure S3. Validation of size selectivity of ammonium sulfate (size selection: 50 nm). The size measured using the SMPS was 49.6 ± 0.8 nm.

CCNC Supersaturation Calibration

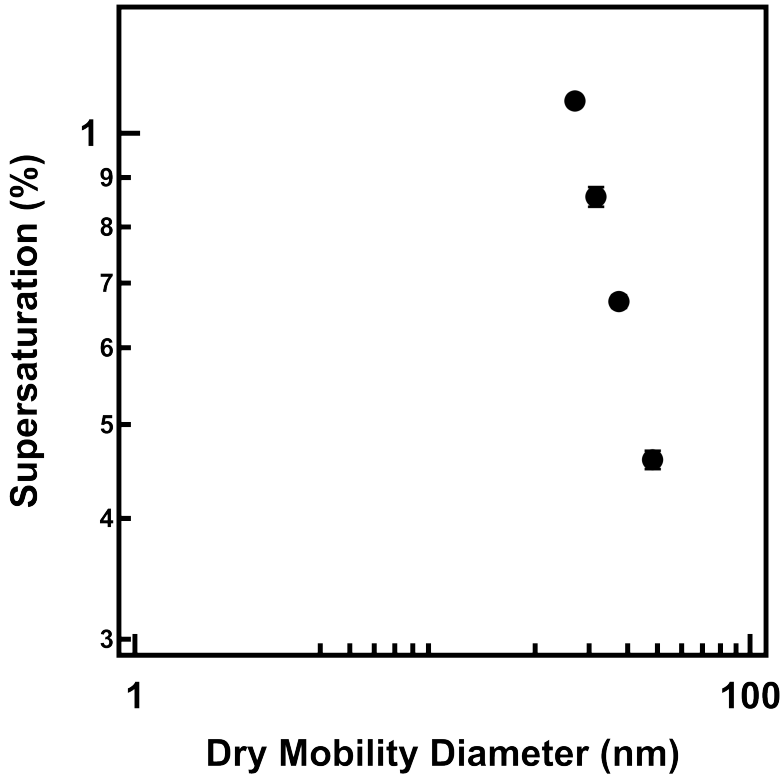

Figure S4. CCNC calibration using ammonium sulfate showing the four supersaturation and their respective dry diameters.

Transmission Electron Microscopy (TEM)

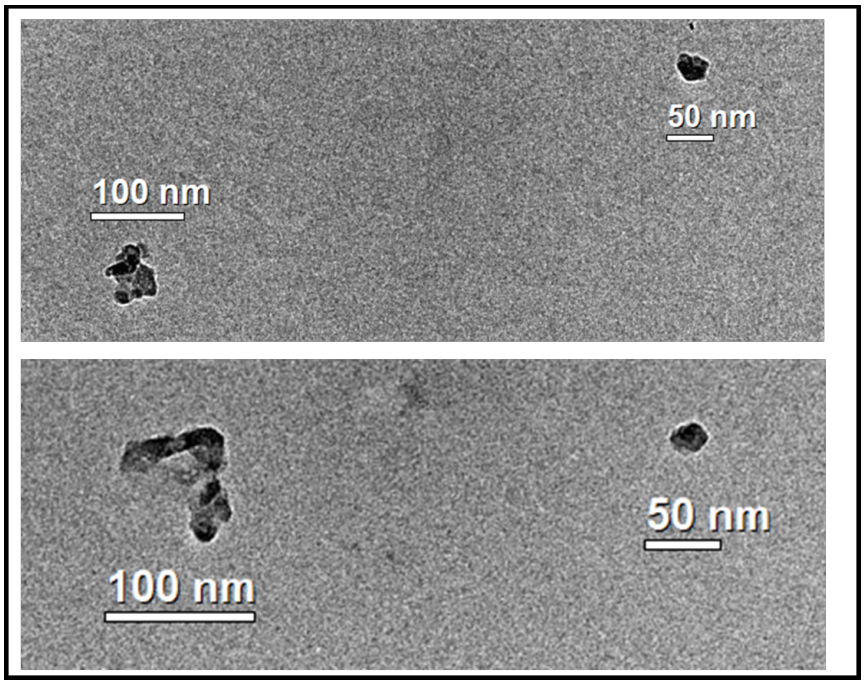

Figure S5. TEM images of *o*-aminophenol showing the morphological difference between large and small size particles.

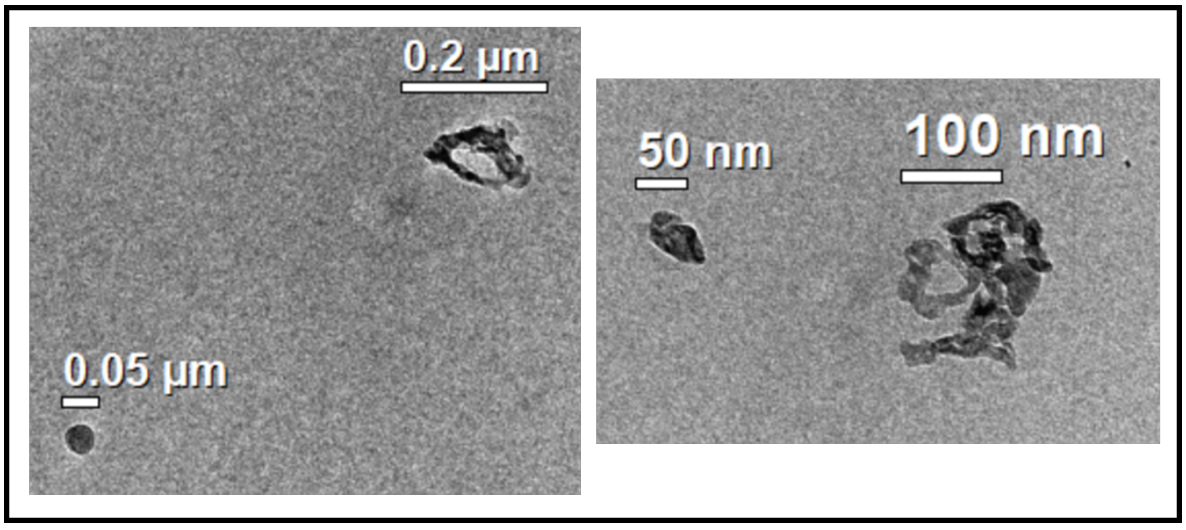

Figure S6. TEM images of *p*-aminophenol showing the morphological difference between large and small size particles.

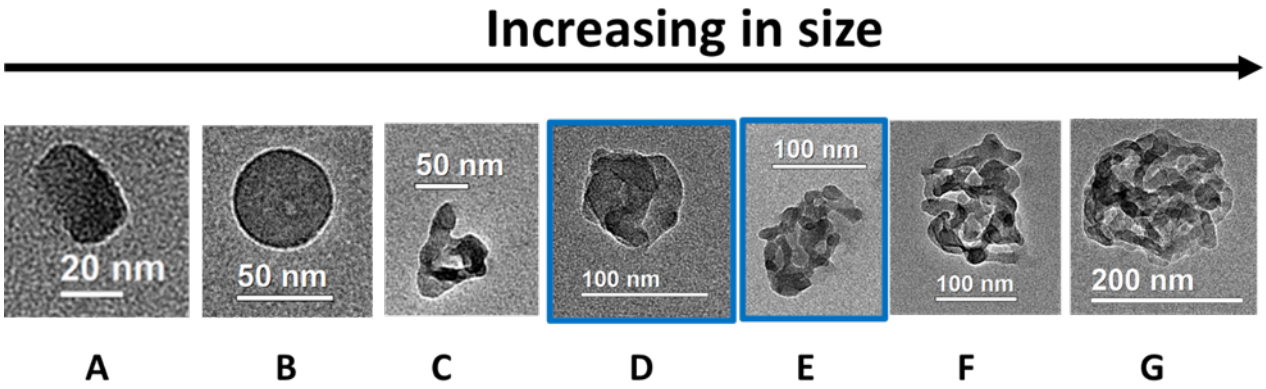

Figure S7. TEM images of *p*-aminophenol particles of different cross-sectional sizes ranging from ~ 20 nm to ~200 nm.

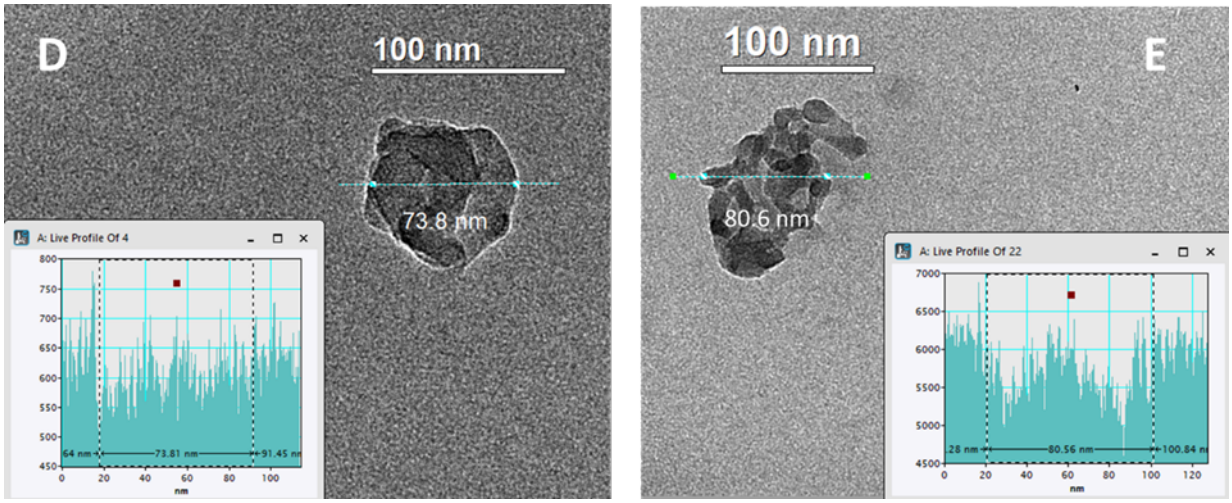

Figure S8. Particle 2D cross-sectional diameter size estimation for *p*-aminophenol particle from TEM images D and E (**Figure S7**) using GATAN software.

Supplemental References

1 N. F. Taylor, D. R. Collins, C. W. Spencer, D. H. Lowenthal, B. Zielinska, V. Samburova and N. Kumar, Measurement of ambient aerosol hydration state at Great Smoky Mountains National Park in the southeastern United States, *Atmos. Chem. Phys.*, 2011, **11**, 12085–12107.