SUPPORTING INFORMATION

Atmospheric nanoparticles hygroscopic growth measurement by combined surface plasmon resonance microscope and hygroscopic-tandem differential mobility analyzer

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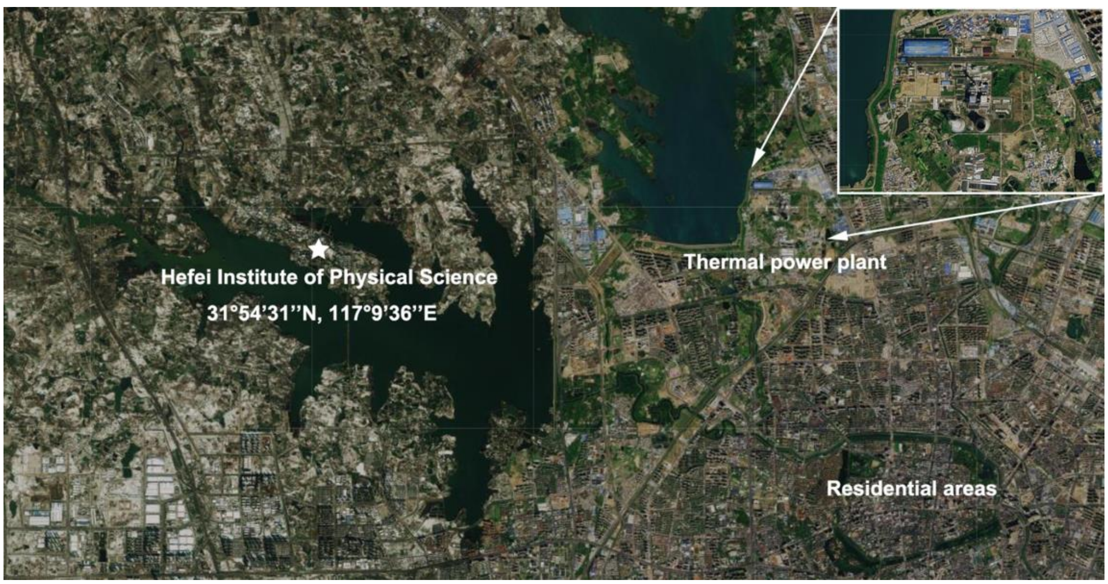

Figure S1. The location of Hefei Institute of Physical Science (from © Google Maps).

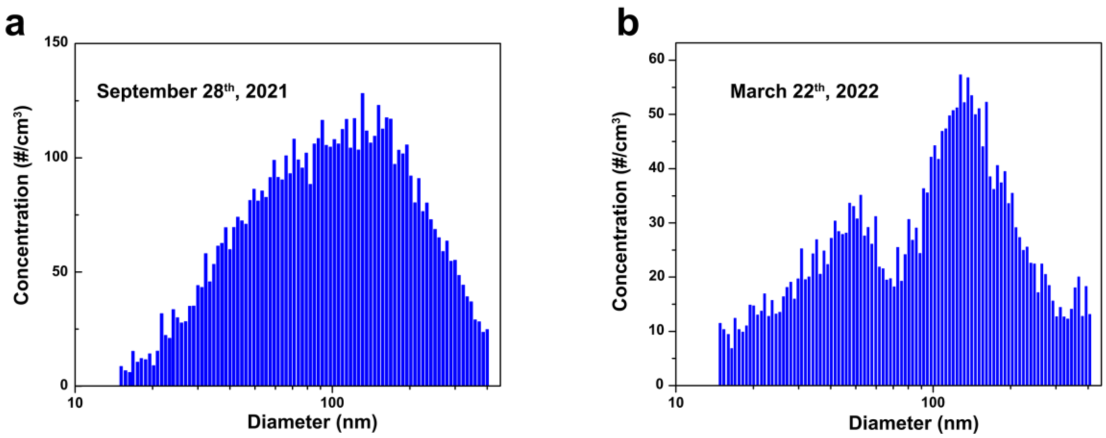

Figure S2. The particle size spectrum of dry atmospheric nanoparticles on at noon, September 28th, 2021 and March 22th, 2022 in Hefei China

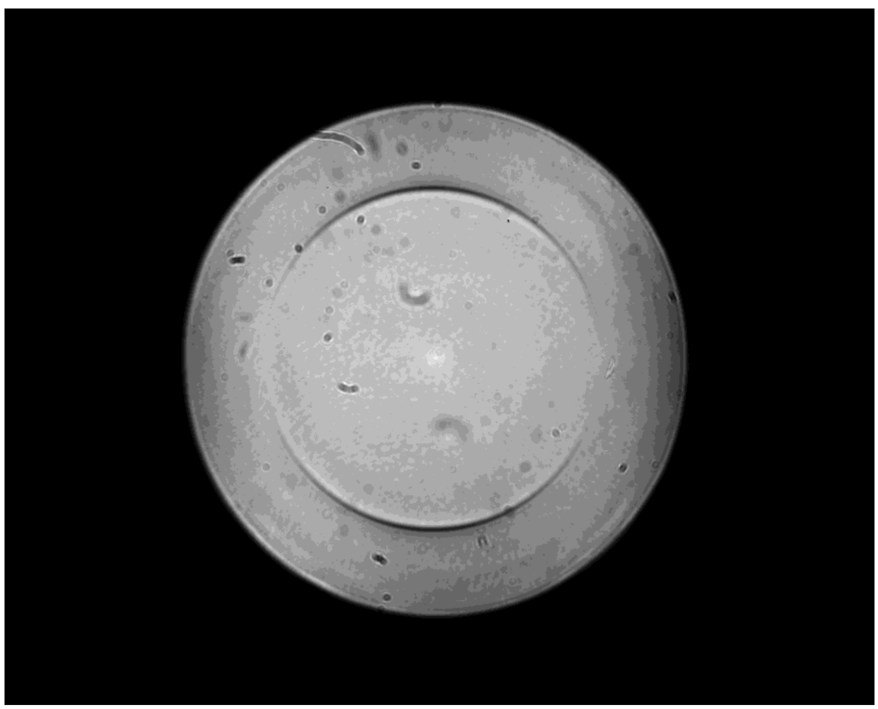

Figure S3. Reflection BFP image of 45 nm Au film.

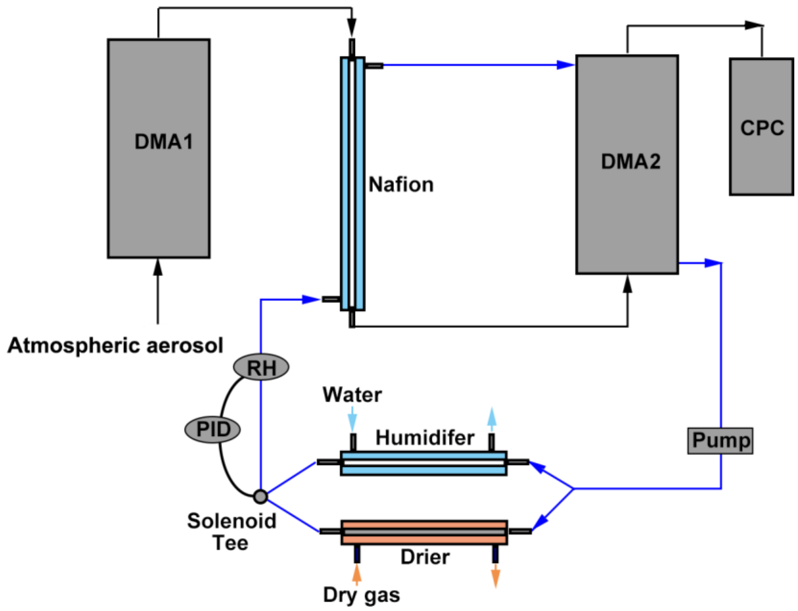

Figure S4. Schematic diagram of HTDMA.

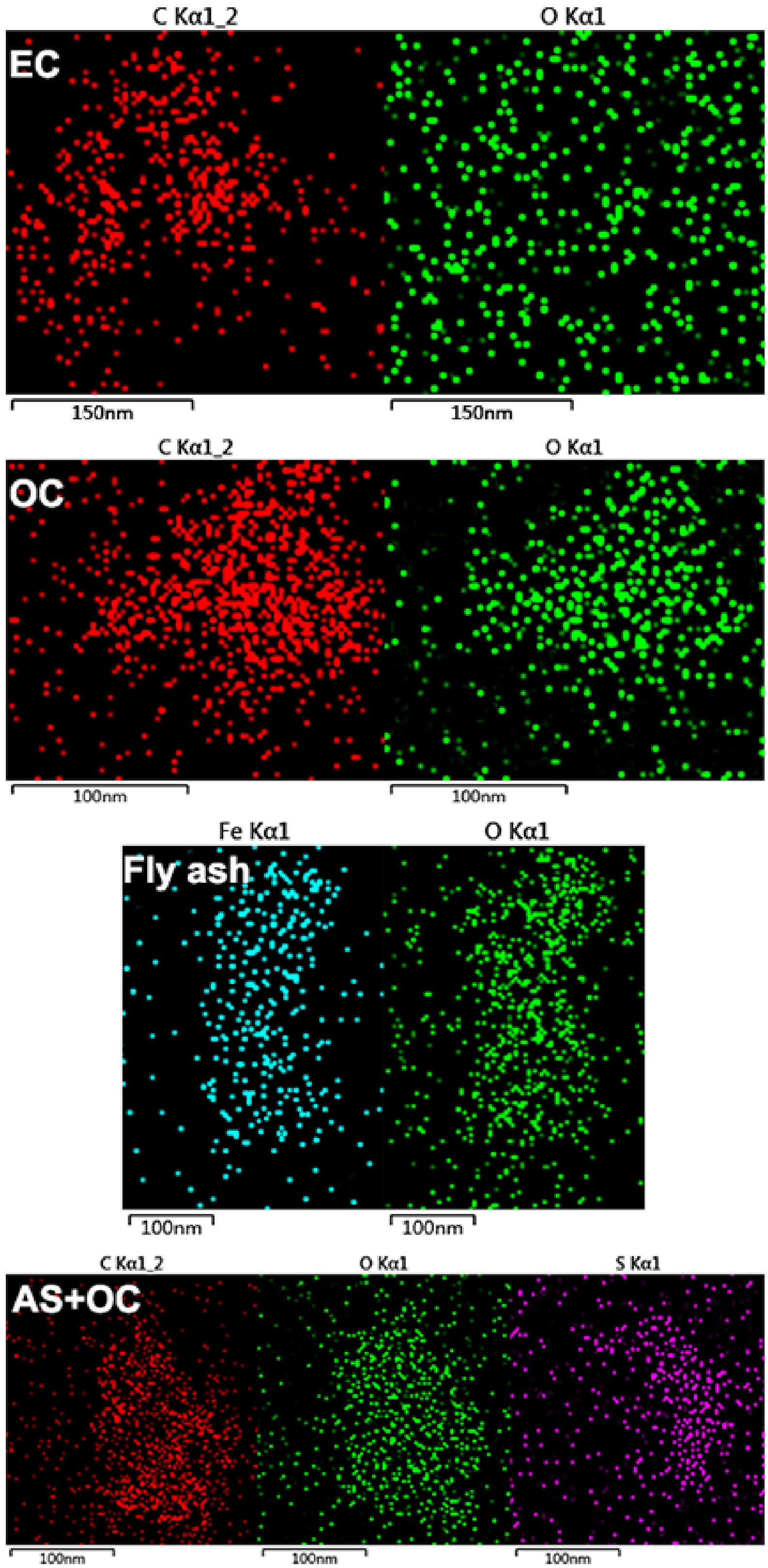

Figure S5. EDS mapping results of 150 nm atmospheric particles on September 28th, 2021.

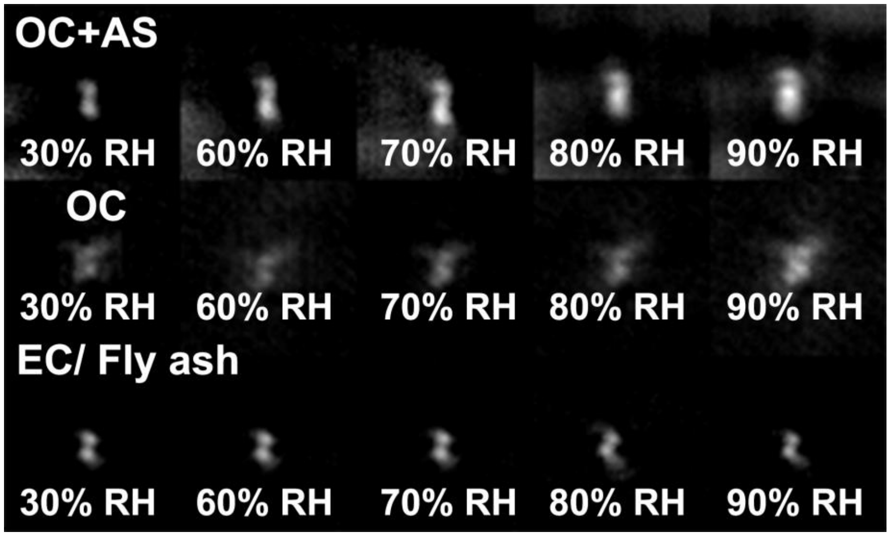

Figure S6. The SPRM hygroscopic growth test results of 150 nm atmospheric particles on September 28th, 2021.

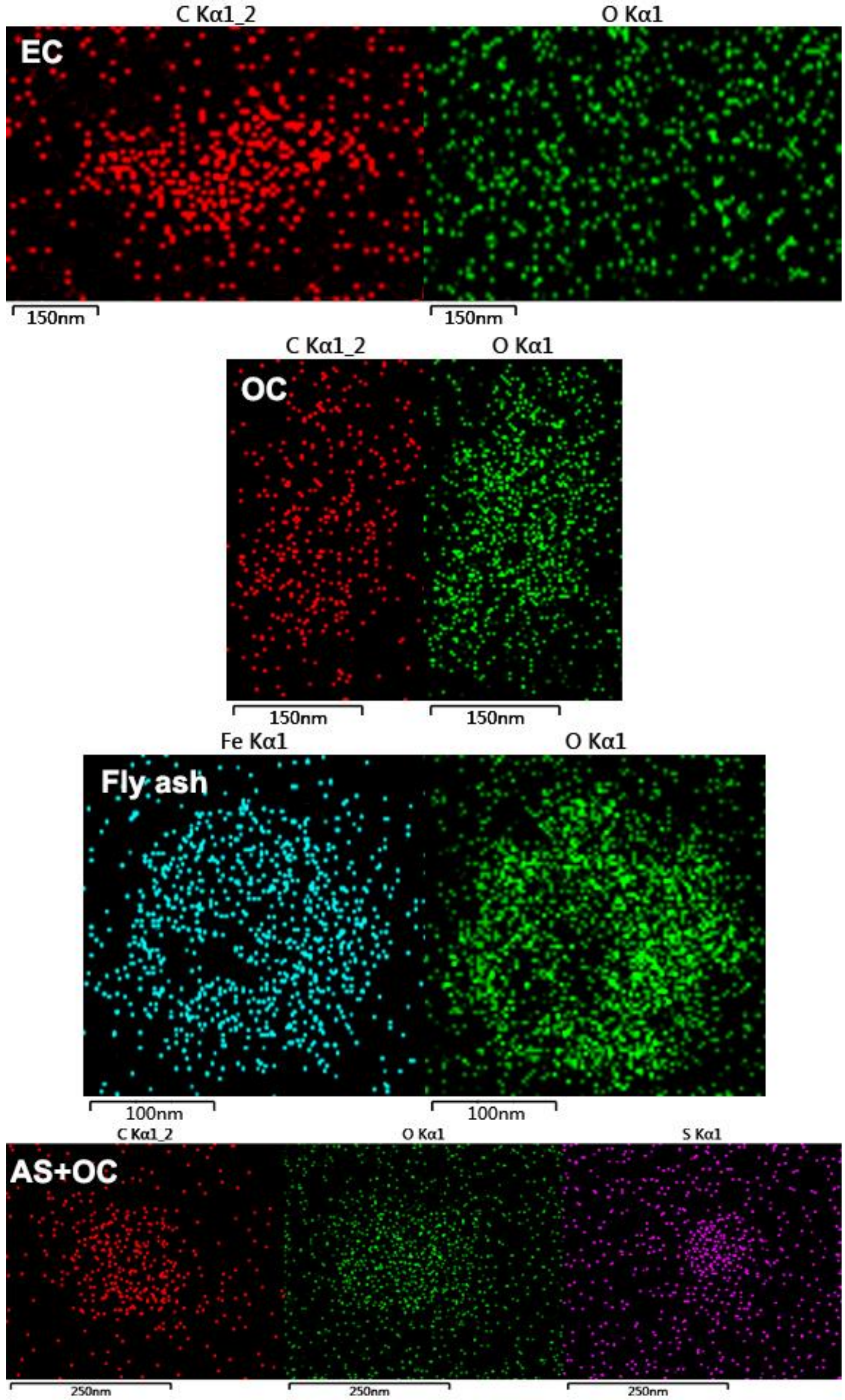

Figure S7. EDS mapping results of 200 nm atmospheric particles on September 28th, 2021.

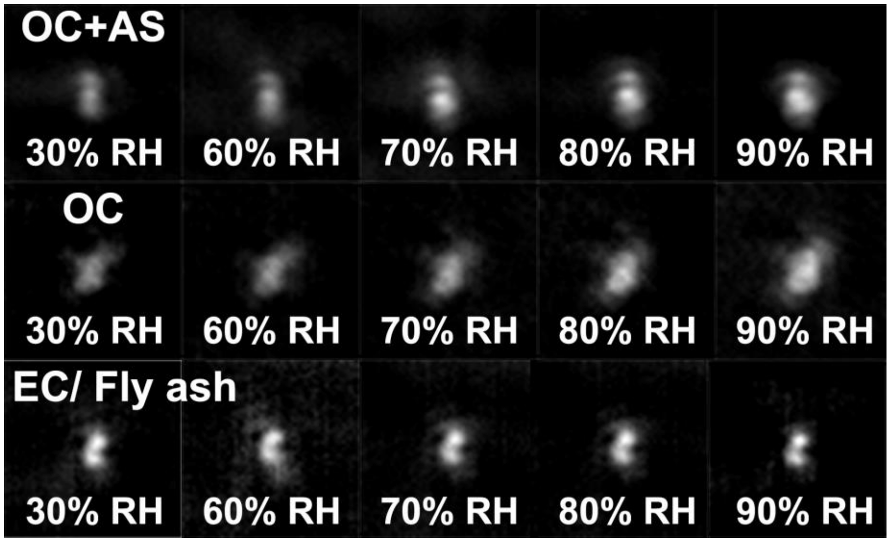

Figure S8. The SPRM hygroscopic growth test results of 200 nm atmospheric particles on September 28th, 2021.

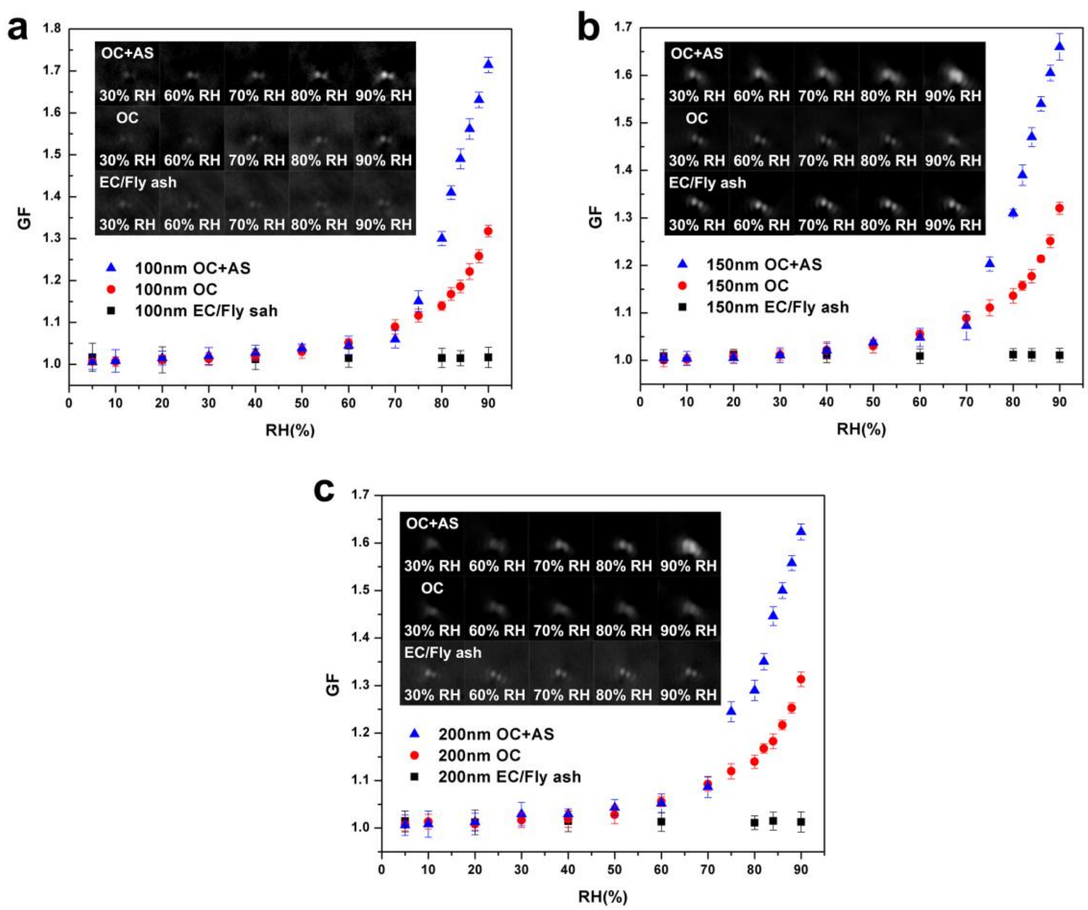

Figure S9 SPRM-ARI hygroscopic growth factors of 100, 150 and 200nm atmospheric particles on March 22th, 2022.

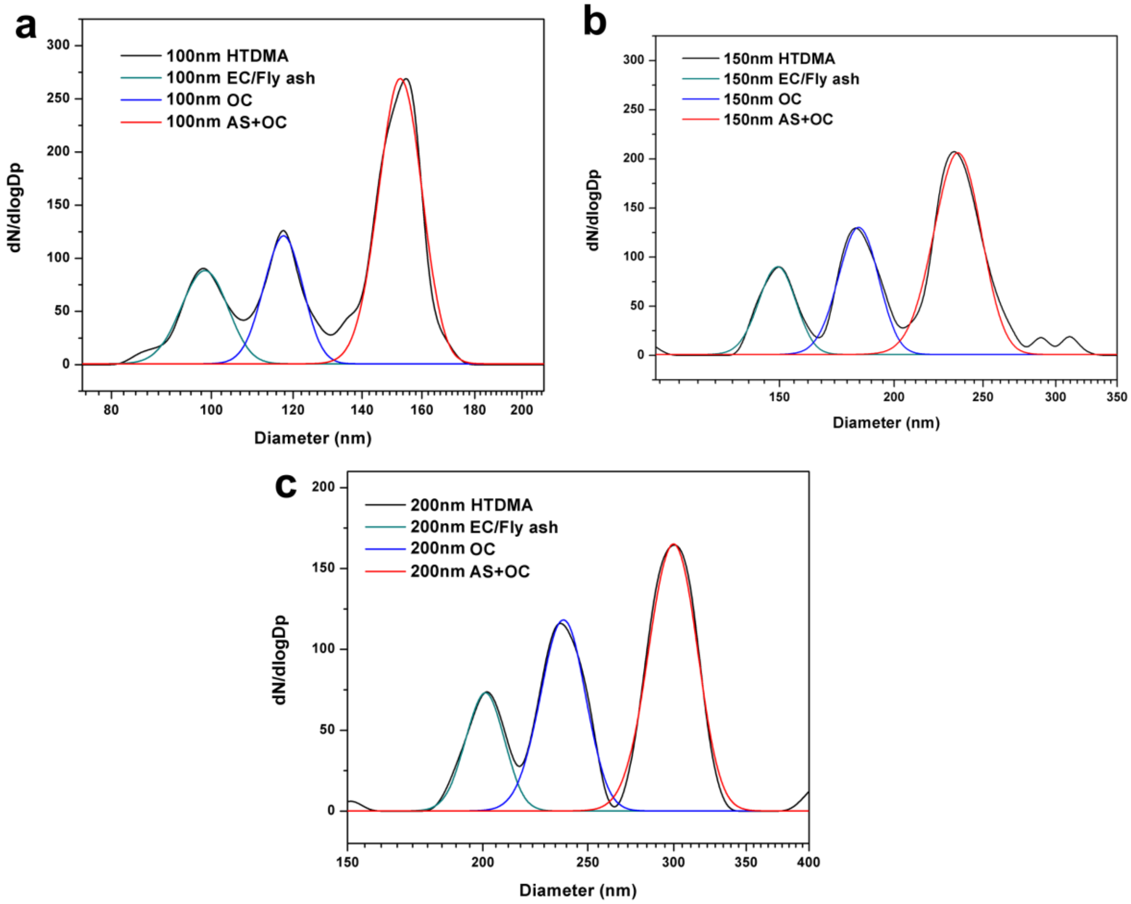

Figure S10 HTDMA peak fitting reconstruction at 84% RH on March 22th, 2022

This research work combines SPRM-ARI and HTDMA technology to synchronously analyze the size-resolved hygroscopic characteristics of ambient aerosols. While HTDMA measures hygroscopic growth of multiple particles of the same size, the SPRM-ARI can be used to quantify the hygroscopic properties of a single particle. Together, they provide a comprehensive study of the hygroscopic properties of ambient aerosols, whereby, the chemical components and related mixing state of nanoparticles can be derived accordingly. This method can be adopted to study the aerosol-water interactions in atmosphere, and the resulting contribution to aerosol radiative effect on climate.