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Supplement of

Hygroscopicity of urban aerosols and its link to size-resolved chemical composition during spring and summer in Seoul, Korea

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Table S1. Statistical values of slope, coefficient of determination ($R^2$), and average and standard deviation of ratio between $K_{chem}$ and $K_{HTDMA}$.

|                | O/C \hspace{1cm} (\kappa_{org} = 0.1 \times (O/C)) | $f_{44}$ \hspace{1cm} (\kappa_{org} = 2.10 \times f_{44} - 0.11) |
|----------------|------------------------------------------------------|---------------------------------------------------------------------|
| Slope          | 0.83                                                 | 0.88                                                                |
| $R^2$          | 0.55                                                 | 0.57                                                                |
| $K_{chem}/K_{HTDMA}$ | $1.06 \pm 0.19$                                      | $1.00 \pm 0.18$                                                     |
**Table S 2.** Frequency and number of data (parentheses) of aerosol Type for four dry diameters (30, 50, 100 and 150 nm) during the measurement period.

| Type 1 (Externally mixed with LH and MH mode) | 30nm  | 50nm  | 100nm | 150nm |
|---------------------------------------------|-------|-------|-------|-------|
|                                             | 14.49%| 30.27%| 77.40%| 79.42%|
|                                             | (222) | (448) | (1209)| (1169)|

| Type 2 (Internally mixed with MH mode aerosol) | 30nm  | 50nm  | 100nm | 150nm |
|------------------------------------------------|-------|-------|-------|-------|
|                                                 | 31.85%| 18.58%| 19.21%| 18.48%|
|                                                 | (488) | (275) | (300) | (272) |

| Type 3 (Internally mixed with LH mode aerosol) | 30nm  | 50nm  | 100nm | 150nm |
|------------------------------------------------|-------|-------|-------|-------|
|                                                 | 53.66%| 51.15%| 3.39% | 2.10% |
|                                                 | (822) | (757) | (53)  | (31)  |
Figure S1. Overview of the 3-factor solution, HOA, OOA1 (LV-OOA) and OOA2 (SV-OOA), from PMF analysis: (a) High resolution mass spectra and (b) time series of the three OA factors.
Figure S2. Measured and Predicted ($NH_4^+$\_pred = 18 \times ((2 \times SO_4^{2-})/96 + (NO_3^-)/62 + (Cl^-)/35.5)) $NH_4^+$ mass concentrations.
Figure S3. Campaign averaged size-resolved mass fraction of chemical composition for non-refractory aerosols.
Figure S4. Scatterplots between mass concentrations of mass-to-charge ratios (m/z 57 for black dots and m/z 43 for red dots) and HOA. The solid lines indicate the linear regression lines.
Figure S5. (a) Time series of mass concentrations for reconstructed HOA (grey) and OOA (pink), and measured organic (green) and scatterplots of measured and reconstructed (b) HOA and (c) OOA mass concentrations.
Figure S 6. Average diurnal variation of hygroscopic growth factor distribution for (a) 30 nm, (b) 50 nm, (c) 100 nm and (d) 150 nm dry diameters (Color bar indicates dN /dlogGF, where $N$ is normalized aerosol number concentration). Reprinted from ‘Impact of urban aerosol properties on cloud condensation nuclei (CCN) activity during the KORUS-AQ field campaign’, 185, Najin Kim, 221-236., Copyright (2018), with permission from Elsevier.