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Hygroscopic behavior of multicomponent organic aerosols and their internal mixtures with ammonium sulfate

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Instrument performance evaluation. To verify the performance of the HTDMA system, the hygroscopic growth of ammonium sulfate during humidification was measured first (Fig.S1). The experiment measurements corrected by considering Kelvin effect were in good agreement with predictions from E-AIM. The measured GF of ammonium sulfate at 80% RH was 1.44 consistent with reported GF=1.45 for 100 nm particles (Gysel et al., 2002; Sjogren et al., 2007).

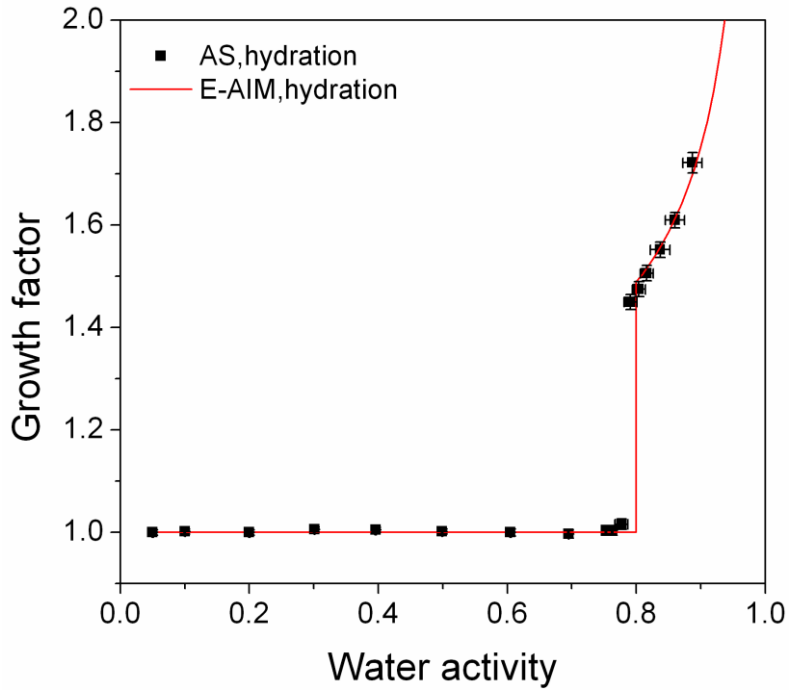

Figure S1. Hygroscopic growth factors of ammonium sulfate (AS) particles as a function of water activity. Initial particle diameter is about 100 nm. Predictions from the E-AIM are also included.

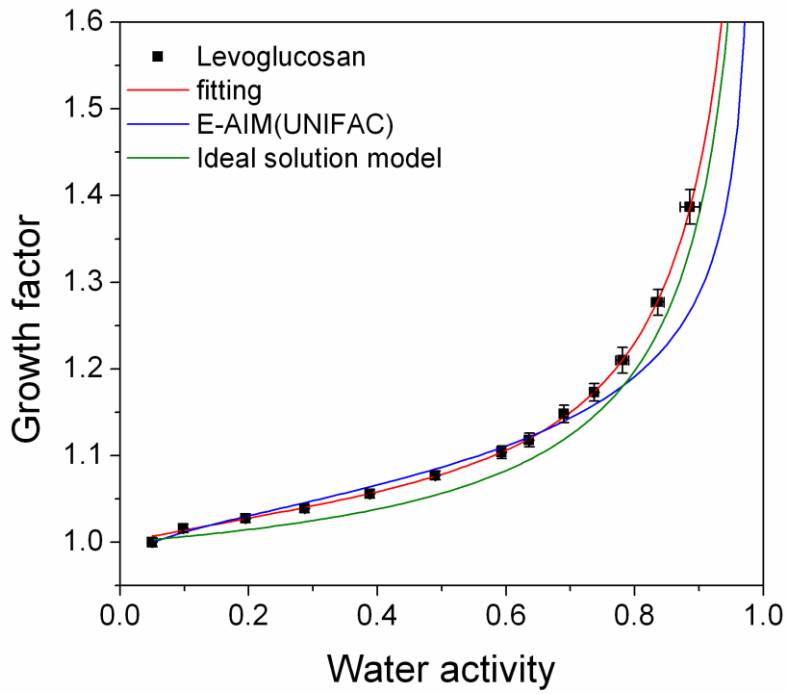

Figure S2. Hygroscopic growth factors of levoglucosan particles as a function of water activity. Initial particle diameter is about 100 nm. The fit curve to the measurements with Eq. (2) is shown. Predictions from the E-AIM (UNIFAC) and ideal solution model are also included.

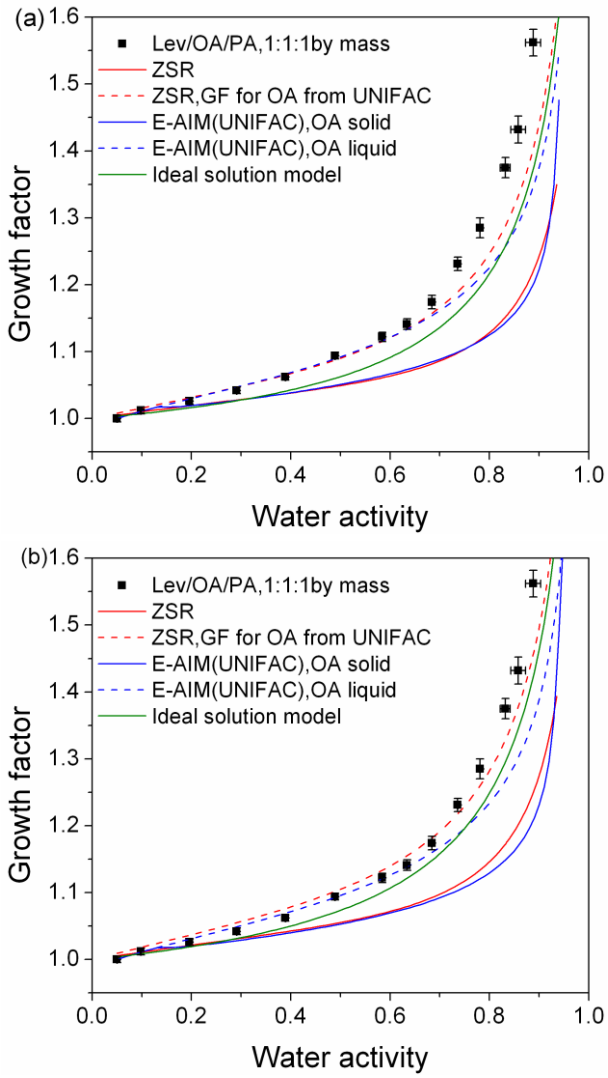

Figure S3. Hygroscopic growth factors of aerosols consisting of levoglucosan, oxalic acid and phthalic acid (Lev/OA/PA) at a mass ratio of 1:1:1 as a function of water activity. Initial particle diameter is about 100 nm. Predictions from the ZSR, E-AIM (UNIFAC) and ideal solution model are also included, assuming (a) oxalic acid dihydrate, (b) anhydrous oxalic acid in the initial particles. The dashed lines are calculated based on liquid oxalic acid (OA) assumption. The uncertainty in our measured growth factors is within 0.02.

References

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