

This work investigated the hygroscopic growth and phase transitions for mixed particles composed of 1, 2, 6-hexanetriol and ammonium sulfate (AS) using an optical microscope and a Raman spectrometer. Liquid-liquid phase separation (LLPS) was observed in their measurements, and DRH, ERH, and SRH were determined for particles with different organic-inorganic molar ratios (OIR). Furthermore, a secondary LLPS phenomenon, confirmed by Raman spectra, was observed in their study, which is interesting and firstly explored. The manuscript is well-written and within the scope of this journal. I have several comments for consideration as below.

Comments:

Line 65: I suggest authors to give a brief introduction about the atmospheric significance of 1, 2, 6-hexanetriol, the organic species investigated in this work. Has it ever been detected in ambient aerosols? Or it was selected as a model species according to the O:C ratio, similar to Bertram et al., (2011)? This should be clarified in Introduction.

Line 100: Why not calculate GF using the image areas of particle at different RH and that of dry particle? How to estimate the diameter for the irregular or non-spherical particles in the software, especially for particles in effloresced state? The deviation between these two approximation methods should be estimated in this section. In addition, have the imaging pixel been calibrated in your measurement?

Line 149-150: “the continuous water release would cause a gradual increase in sulfate concentration in the inner phase, which ultimately results in the occurrence of secondary LLPS.”. What cause the secondary LLPS? Why was it not observed in the study of Bertram et al. (2011)?

Line 178 and 179: I suggest to first introduce the result of mixed particles with OIR=1:4, followed by that of OIR=1:2. Also suggest for Line 200, Figure 4, 5 and 8 and related statements in main text, in an order with increasing molar fraction of organics.

Line 192-194: Please provide appropriate references to support the argument.

Line 240: When compared the phase transition RH with different OIR, I suggest to summarize the DRH, ERH and SRH values in a table in the revised manuscript for clear presentation. Of course, the DRH and ERH of AS, the results for the same systems investigated in previous study, i.e., Bertram et al. (2011), should also be

included for comparison.

Line 250 and Figure 8: Please clearly mention the temporal changes of LLPS dynamic process, not including secondary LLPS in the revised manuscript.

Figure 3(c): Please add the error bars.