Li et al. report for the first time the hygroscopic measurements of MBTCA-inorganic system using Raman spectroscopy. The reactions involving HCl(g) release were discussed using the speciation of COOH and COO-, and related to the hygroscopic curves obtained by the optical imaging of the nominal particle size. This work would be an important increment to our knowledge of SOA hygroscopicity, but the current version is not ready for publication in ACP because of a number of issues as shown below.

The abstract is rather long. I suggest the authors to make the text more concise by focusing more results and their interpretation.

Lines 82-83: It is not clear how MBTCA can accelerate the new particle formation. The authors mentioned that MBTCA is extremely low volatile and one of the SOA components, i.e., one of the particulate compositions. Are you saying that preexisting aerosols enhance the new particle formation?

Line 127: I don't agree with the author's statement that RMS can provide the chemical compositions. RMS detects chemical functional groups of a molecule of interest.

Lines 170-173: It is useful if the authors show the experimentally measured hygroscopic curves of NaCl together with the thermodynamic model prediction.

Why were deposited and levitated particles examined in this study. The authors need to elaborate the necessity of using levitated particles.

In Figure 2, the authors need to explicitly define the type of MBTCA particles. How do types 1-3 of the particles differ?

Line 230: Please provide the evidence of the phase change at RH = 36.7%. The optical images of type 3 particle in Figure 2 show the morphology change from 34% RH to 36.7% RH, but it does not necessarily mean phase change.

Lines 250-252: Please clarify if the authors purposely injected impurity in the MBTCA particles. This is related to my earlier question: what is the type?

Line 270: It is confusing. The implication is based on the previous study or the current study?

In Figure 3, one of the interesting results is the efflorescence at 46.8% RH during the humidification. The explanation for this phenomenon is rather dry. The authors need to elaborate more. It would be also useful if the authors can discuss the repeatability of such a phenomenon.

Based on the chemical reactions the current study has proposed, acidic conditions are preferable for the reactions to proceed. However, Figure 7b shows the higher degree of reaction for particles with MBTCA:NaCl = 1:3 than for those with that = 1:1. Particles with the higher abundance of NaCl (MBTCA:NaCl=1:3) are supposed to be less acidic. Do you have any explanation on it?

Figure 8a exhibits some heterogeneity of elemental distributions for particles with 1:2 and 1:3, which makes me wonder where Raman spectra were obtained. Raman spectra obtained from the edge and the center of the particles would be different.

The levitated particles show the lower reactivity than the deposited particles. The authors ascribed it to less release of HCl and the quenching process, which are too speculative. One more factor I want to point out is the almost one order of magnitude difference of the size between the two particles. It may not affect the reaction rates at a given RH, but it may do the release of HCl. I suggest the authors to discuss the potential size effect on the reactivity difference.

Interestingly, when the authors used the levitated particles, no size decrease (i.e., $A/A0 < 1$) was observed. The authors need to explain it. The size decrease observed with the deposited particles was attributed to the structural rearrange in the main text, but we may be seeing the effect of substrate.