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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Inorganic salts interact with organic di-acids in sub-micron particles to form material with low hygroscopicity and volatility" *by* G. Drozd et al.

**Anonymous Referee #3**

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This paper presents some interesting results which are helpful for understanding the transport and properties of aerosols in the atmosphere. However, I have several questions and suggestions. 1. The title should be changed. This research focused on oxalic acid and used oxalic acid as representative. Although oxalic acid is the dominant DCA in the atmosphere, it is not proper to extend the results of oxalic acid to all DCAs, especially for reactivity and hygroscopicity. A recent work by Ma et al. (2013) showed that the reaction between NaCl and dicarboxylic acids during humidification and dehumidification depended on the species of DCAs as well as the hygroscopicity of formed dicarboxylicates. So, conclusion for DCA based on oxalic acid's results



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should be rigorous. 2. P30660, L 16: Is a residence time of less than one second in the heating tube enough for aerosol particles to be decomposed? 3. P30669, L1: The authors defined 75oC as the onset temperature of evaporation for MOx. However, from figure 4, it seems ambiguous. Can authors show the ms spectra of pure OxA for comparison? Moreover, how to differential the two sources of oxalate signals in CIMS, adsorbed residual OxA or yielded MOx? For Ca-oxalate particles, it would first undergo dehydration and then decomposition to CaCO3 and CaO (Chang and Huang, 1997). Were these components monitored in this study? 4. Conclusion: The authors referred to high oxidation state. Since conversion of oxalic acid to oxalate does not change the oxidation state for both O and C, how do the authors get this conclusion?

References. Chang, H., Huang, P. J.. Thermal decomposition of CaC2O4âĂćH2O studied by Thermo-Raman spectroscopy with TGA/DTA. Anal. Chem., 1997, 69, 1485-1491. Ma, Q., Ma, J., Liu, C., Lai, C., and He, H. Laboratory Study on the Hygroscopic Behavior of External and Internal C2−C4 Dicarboxylic Acid−NaCl Mixtures. Environ. Sci. Technol. 2013, 47, 10381−10388.

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