

Interactive comment on “Hygroscopic behavior of atmospheric aerosols containing nitrates and water-soluble organic acids” by Bo Jing et al.

Anonymous Referee #2

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Jing et al. characterized the hygroscopicity of nitrate aerosols and their mixtures with several model organic acids using an HTMDA. The authors show that the presence of the organic acids can alter the phase behaviour and water uptake of nitrate aerosols, resulting in unexpected growth relative to the modelled growth. This study provides a set of valuable data for the hygroscopic behaviour of nitrate-containing aerosols generated in the lab, which has important implications for the understanding of physicochemical behaviours of atmospherically nitrate-containing particles. The data in this study appear to be of good quality. This manuscript is well organized and clearly presented. It is recommended for publication in ACP after the following minor comments are addressed. 1. P3 L14: Could the authors quantify the nitrate content in the atmospheric particulate matter? 2. P6 L5: Please add a quantitative comparison to literature val-

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ues. 3. P6 L23: The authors can convert the GFs of pure nitrate particles into kappa values based on the method proposed by Petters and Kreidenweis (ACP, 2007). Such a comparison between this study and literature would likely make the results more useful to a broader audience. 4. P6 L27, Figure 1: It seems that AIOMFAC performs better for ammonium and sodium nitrates than calcium nitrates. Please elaborate on the possible reasons. 5. Can the authors explain whether AIOMFAC predictions are from fitted data or from an ab initio prediction? If AIOMFAC is from a fit to data, please cite that dataset. 6. P7 L6: Please quantify how your results are consistent with the observations in the literature. 7. P7 L8, section 3.2: Comparison with the literature results of ammonium sulphate is encouraged when appropriate. 8. P9 L30-31: Please quantify the limited solubility. The occurrence of liquid-liquid phase separation is also influenced by the oxygen-carbon ratio of organic components. If possible, please expand the discussion regarding liquid-liquid phase separation. Thus, it can be helpful to the readers who are not familiar with this issue. 9. P11 L25: The findings reported in this study are likely significant for areas where nitrate concentrations are high. The authors may consider adding some specific areas where your suggested phenomena would be more pronounced.

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