

Interactive comment on “A combined particle trap/HTDMA hygroscopicity study of mixed inorganic/organic aerosol particles” by A. A. Zardini et al.

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We thank the reviewer for the constructive comments and suggestions. Please find below the answers to every specific point (numbered as in the original Referee comment).

1. Brooks (2002) and Wise (2003) were already cited in the paper. Since our paper is not intended to be a review of the deliquescence of mixed inorganic/organic particles, we included all references which are related to the specific compounds under investigation. Therefore, we added only the following suggested reference: Hämeri (2002).
2. Please see our answer to Comment S1602-S1604, point number 4.
3. We clarify that we were thinking of a soluble impurity. Indeed, quite a large amount

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of an impurity is needed to lead to a decrease of DRH by 3-4%. In his comment, Chak Chan mentioned the polymorphism of glutaric acid. We think now that polymorphism (or a combination of polymorphism and impurity) offers a more probable explanation for the observed differences of glutaric acid DRH. Therefore, we focus on this explanation in the revised manuscript. See also our reply to Comment S1602-S1604, point 4.

4. Only a few cycle have been run with this mixtures, but the reproducibility was good. We add the following sentence: "The scattered ERH shown in Figure 5 for different hygroscopicity cycles does not occur when AS is present together with GA."

5. The reason for the high ERH could be an insoluble impurity in the particle investigated by Choi and Chan. The differences during the hydration branch can be explained by the polymorphism of glutaric acid (see response to J. Kelly, Comment S1602-S1604). We assume that in our experiment, which was run at a slow rate, glutaric acid was present in the beta form during the hydration branch. When the hygroscopicity cycle is run at a faster rate, the alpha form may persist up to deliquescence and take up water already at lower RH than the stable beta form. Also, Choi and Chan (2002) discuss in their paper the possibility of mass transfer limitations in the hygroscopic behavior of AS/GA particles. Since our data were taken at a considerable slower rate of RH change, this could explain the smaller difference between the ZSR predictions and our datapoints compared to the Choi and Chan (2002) measurements.

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