

## ***Interactive comment on “Hygroscopic behavior of individual NaNO<sub>3</sub> particles” by M.-J. Lee et al.***

### **Anonymous Referee #2**

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The main finding reported is that the hygroscopic response of substrate-deposited NaNO<sub>3</sub> particles depends on the preparation conditions – one “as received” powder particles and others obtained from a nebulizer. The difference is attributed to different nucleation mechanisms due to a possible presence of presumably insoluble solids acting as a nucleation center for crystal growth. There are several concerns with this manuscript that I would like both authors and editor to carefully evaluate. 1) I find the finding in general useful to the community of researchers who measure hygroscopic properties of substrate-deposited particles that have atmospheric relevance. However, the present work is focused on a single type of particles (NaNO<sub>3</sub>) and thus it is not clear how general is their observation – can similar effect present on other slats as well, for example? With this question in mind, I am not entirely convinced that ACPD is the best place to publish this work. If more particle types would be included to generalize the observed differences, it would justify publishing in this journal, largely due to the

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fact that there are many studies utilizing microscopy techniques to obtain water-uptake properties of submicrometer particles. 2) If more particle types would be included, and similar effect would be present, authors will need to partially rewrite their introduction to strengthen the atmospheric connection, otherwise it reads more like a technical paper specific to the particular experiment that was performed. 3) Was there an attempt to identify the nature of crystal seeds? One could perform PXRD, mass-spec and TGA to get some additional experimental evidence on their presence. As it stands, the conclusion is highly hypothetical, although possible. 4) Minor comment regarding growth factor: the estimate does not take into account particle growth in the height and/or density, and hence has intrinsic error. While same is true for similar techniques like environmental SEM/TEM, a comment regarding this would be useful to include in the manuscript.

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 23203, 2011.

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