

## ***Interactive comment on “Towards closing the gap between hygroscopic growth and activation for secondary organic aerosol: Part 1 – Evidence from measurements” by H. Wex et al.***

### **Anonymous Referee #2**

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This is a well-written manuscript that makes significant forward progress toward explaining the apparent discrepancy between the CCN potential of secondary organic particles and their small hygroscopic growth at relative humidities below ~90%. The authors form pure SOA in a reaction chamber and then measure the CCN potential of the products and their hygroscopic growth. These latter measurements are improved over previous similar studies by the use of the LACIS optical particle spectrometer, which allow the hygroscopicity measurements to be extended to >99% RH. The results showed that the hygroscopicity for SOA increased much more rapidly than would be predicted by traditional theory. Although the full theoretical implications were presented in a companion paper, the experimental results were consistent with the presence of

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slightly soluble material in the SOA.

The work presented is solid, well-documented, and merits publication in ACP. I note no substantive issues that would preclude acceptance in its current form. I do have two suggestions that might guide the authors' future efforts (and might be commented on, at least, in the current work). First, as was noted by the other reviewer, the formation conditions for the SOA in these experiments was very different from those found in the ambient atmosphere. Since recent studies have suggested that these differences can affect some aerosol properties, it would be useful to repeat the study with more realistic conditions. Second, there were at most two repetitions for any of the experiments presented here. The formation of SOA is complex enough that conclusions on so few experiments must be viewed with some skepticism. Without ignoring the significant effort required to make these measurements, the work would be considerably improved by repeating the experiments and presenting the additional data.

In terms of presentation, the most outstanding feature is the need for additional proof-reading prior to final publication. There are too many glaring mistakes to ignore- most should have been found and removed prior to submission. To note two examples, there is a grammatical mistake in the very first sentence of the abstract, and the titles of sections 4.1 and 4.2 are identical. The figures are overall clear and helpful for understand. My lone critique is that the contour lines on Figures 7 & 8 are rather closely spaced for such small figures, to the point that it is difficult to see the key result that the data systematically cross the contours.

The paper should be accepted once these minor editorial issues are addressed.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 955, 2009.

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