

Interactive comment on “Humidity-dependent phase state of SOA particles from biogenic and anthropogenic precursors” by E. Saukko et al.

Anonymous Referee #3

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This manuscript describes measurements on the influence of hygroscopicity on the bounce of SOA particles from various organic precursors. It is a very timely study contributing to the discussion of the physical phase state of atmospheric organic aerosols. The manuscript is a clear and well-written report, and I think suitable for publication in ACP after a few relatively minor issues are addressed:

1. The uncertainty of RH at the point of impaction at LPI deserves considerably more discussion than there currently is in the manuscript. The authors state (on p. 4454) that the relative humidity values were corrected for the pressure drop in the impactor. However, RH is also significantly influenced by variations in temperature - through the exponential relationship between saturation vapour pressure and temperature. How well is the temperature in the different stages of the impactor constrained? At least

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some decrease in temperature is expected because of the expansion - what kind of uncertainty in RH would this correspond to?

2. In general, but also related to the previous comment, the authors need to add error bars to their experimental points in Figs. 3-6 - in particular to the RH axis. Also, please add some estimate on the experimental uncertainties in Table 1.

3. p. 4453, line 1: The oxidation rates in the study are quite a bit higher than the corresponding atmospheric rates. Is it possible that the oxidation rates influence the solidification of the aerosol? The authors should discuss this issue with respect to the atmospheric relevance of their results.

4. p. 4454, line 7: What exactly do the authors mean by the statement "The particles with high bounced fraction are more solid..."? The fraction of solid phase is larger? Their mechanical properties are different? This is a vague sentence and should be revised.

5. Fig. 8. Why is the slope reported as a function of the inverted mass of the precursor? In my opinion the results would be much easier to put into context if the actual mass would be given instead of the inverse.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 4447, 2012.

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