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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Technical Note: New methodology for measuring viscosities in small volumes characteristic of environmental chamber particle samples" *by* L. Renbaum-Wolff et al.

Anonymous Referee #1

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Bertram and coworkers describe a new approach for measuring the viscosity of samples of secondary organic aerosol with varying relative humidity and temperature. In the introduction they highlight the paucity of information available on such physiochemical properties as viscosity. The advantages of the current technique over other approaches (eg. using fluorescent probe molecules) are described. The manuscript is extremely clearly written and the work is of a very high standard. I recommend publication of the manuscript as is, but the authors may wish to consider some of my questions below in any revision of the manuscript.

Given that the Reynolds number depends on gas speed and particle diameter, to what

extent must variations in flow speed and particle diameter be accounted for?

More specifically when considering the flowing gas field, how reproducible is the field around the particle from experiment to experiment, both in direction and in speed? Rather than measuring at only one gas speed, would more accurate measurements be possible if the gradient of the probe bead velocity with gas speed were measured?

When considering the variation with particle size, what variation in probe bead speed is there from measurements on particles of different size? Were deposited particles of a similar size chosen for measurements? Do beads within the same particle move with the same speed independent of where they sit within the flow pattern? Or is the wide uncertainty in bead speed systematically dependent on where the bead circulates within the particle?

Are errors for viscosity measurements (eg. for olive oil) calculated from the spread in probe bead speeds in a single particle or are multiple measurements made over many particles?

In Figure 3, the axes x and y should be defined and the direction of gas flow indicated.

Figure 5: Can the shape of the curve be rationalised?

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 27021, 2012.

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Interactive Comment