

Interactive comment on “Diffusivity measurements of volatile organics in levitated viscous aerosol particles” by Sandra Bastelberger et al.

Anonymous Referee #1

Received and published: 6 April 2017

Review of “Diffusivity measurements of volatile organics in levitated viscous aerosol particles”.

This manuscript focuses on the diffusion of volatile organics in highly viscous aerosol particles. This topic has come to the forefront of atmospheric research due to the recent qualitative field measurements that suggested diffusion rates in atmospheric particles is slow under some conditions and may be important for climate and air quality predictions. Until recently, measurements of diffusion coefficients of organics in particles have been missing. This paper provides some of the first quantitative measurements on this topic.

The scientific quality of manuscript is high. The conclusions are supported by the

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data, and the manuscript represents a substantial contribution to scientific progress within the scope of Atmospheric Chemistry and Physics. The scientific results and conclusions are also presented in a clear and concise way. I recommend publication after the authors have had a chance to address the following very minor comments:

- 1) Page 14, Line 15-16. "it is evident from the sharp RH steps in Fig. 6 that there is no time delay between particle response and the model response". I suspect that there is a small time delay (on the order of tens of minutes) between particle response to RH and the model response, since previous research has shown that there is a kinetic limitation to water uptake in sucrose-water particles at low relative humidities. For clarity, I suggest the authors state the small time delay between particle response to RH and the model response (assuming there is one), and then argue that this small time delay is not important in the current experiments since this time delay is very short compared to the time needed for PEG to evaporate from the particles.
- 2) Page 9. The authors list changes implemented to adapt the model to the sucrose/PEG-4/water-system. In a couple of places it would be useful to indicate the accuracy of these changes. Specifically for points 3-4 it would be helpful to state roughly the accuracy of the methods used to calculate water content and density if known. In addition, for point 5, the authors state "Assuming zero PEG-4 concentration at infinite distance from the particle". Please state the accuracy of this assumption if known.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2017-210, 2017.

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