

## ***Interactive comment on “Water uptake of subpollen aerosol particles: hygroscopic growth, CCN activation, and liquid-liquid phase separation” by Eugene F. Mikhailov et al.***

### **Anonymous Referee #2**

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Eugene et al presented a set of comprehensive hygroscopicity measurement of sub-pollen particles. The paper is well written, and the experimental results are robust. The author measure hygroscopicity ranged from 2 to 1.2%, and the liquid-liquid phase separation model was used to explain the solution non-ideal behaviour. The literature review in the introduction is well written and informative. This is an interesting study and should be published in ACP with minor revisions.

Here are some detailed comments:

The paper is long and hard to follow, there are few parts not necessarily to be in the main text, e.g. section 3.1, 3.2 and 3.4.

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Page 2 line 33: The reference of kappa is missing.

Figure 1 and 2 can go to supporting information.

page 14 section 3.1. is there any size-resolved chemical analysis? I assume figure 3 presented the bulk chemical compositions.

Page 16. It is not clear why the hydrodynamics size distribution and the aging experiments were performed? What is the implication of this experiment?

Page 21 Figure 7. What is the difference between a1 a2 a3 a4? I assume it is the different pictures of the same sample.

Figure 7. The description of SEM can go to the Method section

Page 25 line 3: 0.16 not 16.

Page 25 line 4: Any calculation of kappa based on chemical composition?

Page 26 Figure 11: can you added the shaded area in the left column of GF-RH curves using kappa model, with the lowest and highest kappa in the right column.

Figure 13. Is the difference between Brich SPP, Pine SPP and Rapeseed SPP statistical significant?

Figure 14. Is the liquid-liquid phase separation model used to reproduce the observations? If yes, is it comparable?

Page 34 line 24 it is hard to know Hods et al. (2016) belongs to which sentence.

Page 35 line 1. To me this paragraph is not really related to the main topic of this paper.

Page 35 line 21, is sea-spray aerosol a kind of natural aerosol?

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1224>, 2020.

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