

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2021-30

Anonymous Referee #2

Referee comment on "Interactions of organosulfates with water vapor under sub- and supersaturated conditions" by Chao Peng et al., Atmos. Chem. Phys. Discuss.,
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The paper by Peng et al. addresses gap knowledge of organosulphates hygroscopic properties and CCN activity. Organosulphate hygroscopic properties have not been systematically studied to date and as such paper is a significant contribution to atmospheric science. The paper is generally well written although a moderate revision is needed to meet the publication standard of ACP.

Line 36. Maintain three significant digits for consistency. Even the third digit of the value is imprecise, because the standard error is changing the second digit.

Line 42. Quantitative numbers needed to illustrate qualitative terms like "reasonably well", especially in the Abstract.

Line 157. ΔGF should have reflected Kelvin effect which was not negligible for 100nm

particles. The authors could use kappa method in estimating Kelvin effect against e.g. 300nm particle were Kelvin effect would be immeasurable.

Figure 3. Is Figure 3 meant for illustration purposes or is the result? It is unnecessary for the former and if for the latter it should be presented in terms of SS_{crit} as a function of D_{crit} along with ammonium sulphate.

Line 195. It is difficult to judge the significance of 11% without uncertainty error bars. Could it be due to physical spatial arrangement of 1mg mass lump?

Line 212. Measurable, not obvious. Nothing is obvious in scientific experiment.

Line 214. suggesting the occurrence of ...

Line 218. Interestingly, that in this case the authors discount 10-20% increase, contrary to ethyl-OS increase of 11%, mentioned earlier.

Table 1. Maintain three significant digits throughout.

Figure 5. I believe that a) and b) were split due to methyl and ethyl OS being similar and partly overlapping, but it is exactly for the same reason they should be on the same graph and if a single graph was bigger it would exhibit those differences clearly.

Line 254. DMA sizing precision is at best 5% (Wiedensohler et al. 2012, AMT) and, consequently, 7% of the two DMAs. Clearly 8-9% difference can be attributed to sizing uncertainty of different HTDMA systems.

Line 297. That is understandable as the bulk material is present in large lump of mass (1mg is huge when compared to single particle). In order for VSA to represent microscopic particles, one should use tiny amount of substance spread as e.g. 100nm film, which is challenging and impractical, thereby limiting the usefulness of VSA for atmospherically relevant studies.

Line 379. The authors should emphasize that reduced hygroscopicity was measured in supersaturated conditions while in subsaturated conditions hygroscopicity was higher as revealed by HTDMA (e.g. 60-70%).

Line 416. ...but much less pronounced for a mixture octyl-OS/AS. ("mixture" should be emphasized)

Line 417. What about the discrepancy of methyl and ethylOS despite both being very

soluble? That should be noted and discussed, especially that their kappaGF are higher than kappaCCN.