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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Changes of fatty acid aerosol hygroscopicity induced by ozonolysis under humid conditions" *by* O. Vesna et al.

O. Vesna et al.

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We would like to thank this reviewer for his valuable comments.

Regarding his major comment, the construction of growth factors from the measured functional group analysis, we would like to state that this was not the main aim of this study. Our study demonstrates that ozonolysis of oleic acid particles under reasonably realistic conditions does not lead to a substantial increase of hygroscopicity, while this is the case, when a polyunsaturated compound, arachidonic acid, is used as parent material. In addition, and surprisingly at first glance, humidity during reaction was playing a decisive role in determining hygroscopicity of the product particles at least under the short time scales of the present study. The NMR analysis showed an increase in the ratio of carboxylic to aliphatic protons in line with the growth factor. The idea of the back of the envelope calculation using ZSR was more to rationalize the parallel

evolution of the two quantities rather than providing a real quantitative estimate. The composition of the product particles is far away from those, which would allow ideal solute behaviour.

We admit, however, that the presentation of this calculation has got too short and in addition contains a typo as correctly pointed out by the other referee. As suggested, we will simplify and clarify the presentation of the calculation and will emphasize its qualitative character.

Regarding decomposition of the parent compounds, we note that we have frequently exchanged the reservoir in the evaporator. In initial experiments, we have observed that the liquid turned yellow after extensive periods of time indicating oxidation and decomposition. In a separate work (manuscript in preparation), we have used GC-MS to characterize oleic acid particles from the same source and could not see any evidence of smaller decomposition products before reaction with ozone.

Regarding the absence of deliquescence, as mentioned in our response to the other reviewer, we will change the appearance of figure 1 to better emphasize the role of ozone processing and deemphasize the difference between hydration and dehydration. We will also explicitly state in the text, that no difference was observed.

The experimental part will be amended to mention how humidity was adjusted and controlled.

Regarding presentation of the humidogram for arachidonic acid ozonolysis under dry conditions, we will extend figure 1 to include these data by adding color.

As pointed out in response to the other reviewer, we will add further caveats along with citations to include the possibility of evaporation also for the acids, not only for the aldehydes. The statement that especially humid conditions the acids are less affected by evaporation than the aldehydes should still be ok.

As mentioned above the paragraph estimating the growth factors will be rewritten ac-

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cording to these suggestions.

The GF90 were indeed not corrected from the measured GFs but rather calculated from those measured close to 90%. We will correct this and explain in the text.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 15651, 2007.