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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemical aging of *m*-xylene secondary organic aerosol: laboratory chamber study" *by* C. L. Loza et al.

Anonymous Referee #1

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General:

The manuscript describes results of a chamber study on formation and ageing of SOA generated from m-xylene. The formation and ageing are induced by OH radicals formed by a photolysis of H2O2. Total mass, elemental ratios, and fractions of C2H3O+ and CO2+ derived from AMS data serve as diagnostic quantities to follow the chemical evolution of the SOA particles. The authors show that the main path of ageing is gas-phase conversion of semi-volatile species, either by OH or by photolysis. This was corroborated by analysis of gas-phase oxidation products with CIMS stopping the photochemistry after 12 h. The manuscript is timely and clearly reports new, interesting and important results. It is clear and well written.

The manuscript is suited to be published in ACP as it is.

Nevertheless, I suggest that the authors consider the following minor comments:

Minor comments:

page 24977, line 13f I wonder if wall deposition can really compete with condensational growth of the suspended particles at least for low volatile species.

page 24979, line 18f Why does ΔM0 in Fig. 1 decrease at long times ? I expect ΔM0 to be a monotonic *increasing* function in time.

page 24980, line 10 and Fig.2 To me it looks as if the single experiments have a slight offset in O/C with respect to each other. I suggest to determine the rate of O/C change for each experiment separately and average the slopes. I am convinced the average ageing rate is larger than 0.0012h-1. The dashed line Fig. 2 seems to be to flat.

page 24981, line 17f The data is ratioed to SO4 and normalized, also relative. The term "the *total* amount of each of the ions" seems to be misleading in this context.

page 24985, equ. 9 The OH lifetime depends on Ap. What did you assume for for the surface concentration ?

page 24987, line 19 But there is also evidence that high generation products are only slowly attacked by OH in the gas-phase. This rises the question if in such cases condensed phase OH becomes important or if low vapor pressure compounds are quasi-inert and persistant for typical atmospheric lifetimes of particles.

Fig.9 The captions are a little too scarce. Please, explain in the captions the difference between the two experiments.

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