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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A new source of methyl glyoxal in the aqueous phase" *by* M. Rodigast et al.

Anonymous Referee #2

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These authors offer an alternative pathway of methylglyoxal formation in the atmospheric aqueous phase. Namely, the authors have investigated the aqueous phase oxidation of methyl ethyl ketone (MEK) by highly reactive hydroxyl radicals (OH). Few reaction products of atmospheric relevance were detected and identified i.e. 2,3-butanedione, hydroxyacetone and methylglyoxal. A reaction mechanism has been proposed for the formation of methylglyoxal and evaluated with a model study. The experiments are very well done and the authors have carefully addressed all issues regarding the application of these results to atmospheric aqueous phase. The paper is concise and nicely written, with no excess information. ACP is an appropriate journal for the paper on this topic. It can therefore be published in ACP after minor revisions.

How relevant are the used concentrations of 0.1 mmol l-1 of MEK in these experiments

compared to the concentrations of MEK in cloud water ranging between 70 and 650 nmol l-1 (van Pinxteren et al., 2005)? How the concentrations of MEK would impact the experiments?

The authors did not precise at what temperature were performed the experiments? I suppose at ambient temperature (298K). How important is this pathway of methyl glyoxal formation in comparison to the other sources? Reactions of carbonyl compounds in tropospheric clouds produce organic aerosol mass through in-cloud oxidation and during post-cloud evaporation. To get a clearer picture about the impact of these processes on the SOA formation one has to compare the OH radical reactivity in the aqueous phase with the evaporation post-cloud processes at lower temperatures, at the range between 5 and 15°C relevant for the tropospheric clouds. I would like to see discussion on this issue.

Some minor issues: Perhaps a right axis can be added in Figure 1 with different scaling than the left axis in order to better present the molar yield of hydroxyacetone. In figure 3 you either describe MEK (black) and 2.3 butanedione (red) in the caption or in the legend. The same applies for Figure 6.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 31891, 2015.