

## ***Interactive comment on “LC-MS analysis of aerosol particles from the oxidation of $\alpha$ -pinene by ozone and OH-radicals” by R. Winterhalter et al.***

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The following comments were received from anonymous referee # 2

In this manuscript the authors describe results of extensive experimental studies of secondary organic aerosol formation from oxidation reactions of  $\alpha$ -pinene performed in the large Euphore reactor. The paper describes results of painstaking chemical analyses that are very nicely done. I am impressed by the time and effort that must have gone into this study. Unfortunately, the manuscript does not do justice to this nice work. My personal opinion is that the manuscript reads a bit too much like a report written to document the work that was done rather than to provide a coherent description of motivation, experimental design, analyses performed, and data interpretation. For example, in the introduction, one is told that a number of other studies have been

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performed on these systems, but there is no mention of why the authors think they can do better, and/or what their approach can add. As one can see from reading the conclusions, there appears to be little in the results that was not already known before the studies were performed. I understand that there are important reasons to study systems that others have studied, and that this system is particularly important. I would like to see a justification for this huge effort. I would also like to see a more thorough explanation of the study methods and results, clearly pointing out what is new, what is interesting, and why. I think it is unusual that one can explain 15 pages of data (Figures and Tables) with less than 10 pages of text. I cannot help but think that with all of this wonderful data there must be more significant things that can be said. It may be that the authors should consider leaving out some of the results and instead select a subset of the material that can form the basis of a simpler, but more cohesive paper. I think the paper can be made publishable but encourage the authors to spend more time trying to address some of these comments. I offer also a few more specific suggestions/comments:

1. Page 4: It is not clear how the quantitation was performed. Is this based on a total ion signal for the chromatographic peak or a single mass? How sensitive is this factor to the particular compound? For example, for analysis of a few different carbonyl standards what is the range of response factors? This is information that should be easily available and is necessary for the reader to have any sense about the uncertainty in the quoted concentrations.
2. Page 4.: It seems to me that a better interpretation of Figure 1 might be that the aerosol formed in the ozone reaction is less volatile than in the OH reaction. When comparing all the ozone experiments to each other, or the photo-smog experiments to each other, there seems to be no dependence on sampling time.
3. Page 6: How is the correction made for  $\alpha$ -pinene using SF<sub>6</sub>, when the latter is expected to be inert and  $\alpha$ -pinene is more likely to stick to the walls.

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4. Figure 4b: Why is there such a large correction for aerosol mass concentration? This seems to be much too large for wall losses in such a large chamber. Even after 1 hour the correction is more than a factor of 2, whereas in much smaller chambers losses are only ~10-20% per hour. The method used to make this correction should be described in detail.

5. Figure 6b: Aerosol volume units are wrong.

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