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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Influence of NO_2 on secondary organic aerosol formation from ozonolysis of limonene" *by* Changjin Hu et al.

Anonymous Referee #1

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This manuscript describes a laboratory and modeling study of SOA formation from the ozonolysis of limonene in the presence of NO2. The manuscript is topically relevant to ACP. The authors need to make clearer the unique contribution of this research, and how this manuscript advances the field. Specifically, I have two main criticisms: (1) Are the SOA yield differences meaningful for cases when similar delta SOA is observed with and without NO2? (2) Are the resulting changes in SOA yield and composition a consequence of different O3 chemistry or do they just reflect NO3 chemistry at high NO2? The impact of the research is clearly reduced if the authors are merely reproducing NO3 oxidation experiments under high NO2 conditions.

Specific comments:

1. Experimental methods - were these experiments conducted in the dark?

2. Figure 2 - I suggest that the authors place error bars on the yield data. Is the difference between NO2 and non-NO2 experiments truly meaningful?

3. Figure 2, Lines 295-310. The figure shows that the experiments with the highest SOA yield had NO2. But I am unconvinced by the argument NO2 is causing the higher yields, because it is extremely difficult to compare "paired" sets of experiments (e.g., X ppb limonene and no NO2 versus X ppb limonene and Y ppb NO2).

4. Line 367 - what drove the temperature difference between the sets of experiments?

5. Figure 4 would benefit from having a 1:1 line

6. The authors should comment on what fraction of the limonene reacts with O3 versus NO3 - at least for the endo bond - in the various experiments. It seems like this should be retrievable from the MCM runs.

7. Is scheme 1 new - generated as a result of this work - or reproduced from the MCM? If it is from the MCM, the authors need to clearly state that the Scheme is not their original work. The same applies to Table 2.

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