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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A mass spectrometric study of secondary organic aerosols formed from the photooxidation of anthropogenic and biogenic precursors in a reaction chamber" *by* M. R. Alfarra et al.

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We would like to thank Prof. Seinfeld for his review of our manuscript.

During all of the six experiments reported in this manuscript, NO concentrations were below the instrumental detection limit after 1 to 2 hours after lights were turned on as shown in the Figure A. In each experiment, particles detectable by the CPC started to be formed immediately after NO consumption (conversion by oxidation) and it was not before another at least 1 to 2 hours that particles grew to sizes detectable by the AMS. Consequently, all AMS measurements were performed under very low NO conditions (below detection limits) and no measurements were possible at times of high

NO concentration. Therefore, it is not possible from this work to report on differences in the mass spectral patterns under low- and high-NO regimes. We agree with Prof. Seinfeld's final statement that all experiments in this study were performed in the same NO regime. The dramatic changes in SOA chemistry reported by Kroll et al, (2005b, 2006) and referred to by Prof. Seinfeld were observed when experiments performed under free- and high- initial NOx conditions were compared. None of the experiments reported in this paper was performed under free initial NOx conditions. A future publication by our research group will be dedicated to the effect of NOx concentrations as well as the VOC/NOx ratio on SOA formed in the PSI chamber.

Figures A & B:

http://lac.web.psi.ch/public/Alfarra_et_al_ACPD_NO_and_NO2_temporal_behaviour.pdf

Specific comments:

1. NO data is shown in figure A but we do not think that there is a need to show it in the manuscript. Unfortunately, reliable temporal NO2 data is not available for the experiments reported in this manuscript. Such data are, however, available for experiments which were performed later. NO and NO2 data measured during a TMB experiment with similar initial concentrations to experiment 3 (discussed in the manuscript) are shown in Figure B as a representative example.

2. Figure 2 represents experiments 3 and 4 for TMB and -pinene, respectively as stated in the text. This will be further clarified in the figure caption of the revised manuscript.

3."once the NOx has been consumed" means once its concentration drops to low levels after its conversion to more oxidised nitrogen-containing species (e.g. NOy). As for the behaviour of NO and NO2, Figures A and B show that NO concentrations drop to levels below instrumental detection limits within 1 to 2 hours after lights on. On the other hand, NO2 concentrations peak around the same time NO decays and it takes

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about 4 hours for the NO2 concentrations to decrease to very low levels. No reliable NOy data are available for these experiments.

4. Kroll et al, (2005a) will be cited in the revised manuscript as suggested by the reviewer.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7747, 2006.