Real-time Measurements of Secondary Organic Aerosol Formation and Aging from Ambient Air in an Oxidation Flow Reactor in the Los Angeles Area

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The authors present results from an experimental study in which the aging of ambient air is oxidized using a PAM reactor. This paper demonstrates of the PAM reactor as a tool evaluation of SOA formation during field studies. The study and the manuscript are well organized and documented and I recommend for publication. However, I have several comments (most minor and for my own curiosity) before this manuscript can be accepted for publication in Atmospheric Chemistry and Physics.

Questions:

Experimental Methods

Page 21914: Line 10: The PAM reactor operates similar to a batch reactor giving you the spatial average of oxidized particles rather than with a traditional flow-tube you have particles with the same oxidative lifetime. Do you expect this to affect your results?

Page 21914; Line 10: How long does it take the PAM reactor to reach equilibrium, in other words how long does the reactor need in order for complete replacement of particles? (I think this is 20 minutes if so please make it clearer in the text)

Page 21914; Line 10: Since the output of your photolysis lamps are 254 nm do you expect any significant photo-degradgation from any of your organic species of interest? Do you expect any of these reactions to lead to SOA formation?

Page 21915; Line 11: Do you expect loss of your compounds to be from ozonolysis rather than OH given that O_3 is being used as the precursor for OH? Were any experiments performed using HOOH? Were blank experiments performed to make sure there was not loss from photochemistry?

Page 21916; Line 1: Is there a reason a gas-phase tracer (for example hexane) was not used to monitor your OH concentrations? This seems like it would be a more accurate method of quantification.

Page 21917; Line 15: Is there a reason why SVOC is not discussed in this manuscript? If there is could you please explain some of the issues of quantification of these species? (I assumed this will be a topic of an additional paper but this question is more out of curiosity)

Page 21918; Line 13: How much loss of LVOC did you measure on the walls or exiting the reactor? What is the percentage of wall loss?

Page 21918; Line 15: What are the rough percentages of LVOC fate of each pathway (condensation, wall loss, fragmentation) in each OH concentration regime (low, medium, high)?

Observations

Page 21919; Line 5: It is explained later in the paper but it would help orient the reader if a brief discussion of the type of ambient precursors you might expect at your location?

Page 21919; Line 25: What type of precursors for SOA do you expect to be depleted in the ambient air?

Page 21920; Line 28: Could the loss of OA be due to the high OH concentrations that are forcing chemistry through channels that don't typically exist (ie, RO_2 + RO_2 chemistry)? How much of this OA loss do you expect to be through this pathway? (Reason I asked for rough percentages above).

General Questions:

Was NO_x measured and if so was there any effect you would expect in SOA formation?

Figures:

Page 21948: Please add part c to the figure which is a picture of the sampling site.

Page 21949: What is the error in the concentration of O3 and OH in the reactor?

Page 21950: The differences in the reactor and ambient colors are really difficult to see. Is there a way that you could make this clearer?

Page 21951: Please explain where the error bars come from and whether they are 1s or 2s? Please put in the caption.