Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2017-400-AC2, 2018

Atmospheric Measurement Techniques Discussions

Interactive comment on "Identification of Organic Hydroperoxides and Peroxy Acids Using Atmospheric Pressure Chemical Ionization – Tandem Mass Spectrometry (APCI-MS/MS): Application to Secondary Organic Aerosol" *by* Shouming Zhou et al.

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Received and published: 16 April 2018

Summary:

This AMTD article a new analytical method that the author developed to identify organic hydroperoxides and peroxy acids. One of the unique properties of this technique is that it can direct analyze liquid samples using a positive-ion CI-MS/MS under atmospheric pressure. This study used pure standards first to verify the technique, and then

measured ROOH in alpha-pinene ozonolysis SOA. Overall, the manuscript is sound and after addressing the following issues, it is suitable to be published on AMT.

Response: We thank the reviewer for the positive comments on our work.

Comments:

Page 3, section 2.3: the author described the method used to collect SOA filters. There is no SOA mass concentration nor the mass of SOA collected on the filter reported. Since the author mentioned "SOA generation is confirmed by a SMPS", then number-diameter distribution of the SOA should be put in the SI. The author should also report the SOA mass concentration and estimate the mass of SOA collected on the filter so it will give readers a reference point about how much SOA mass was analyzed.

Response: We thank the reviewer for pointing this out. A new figure showing the particle size distribution is given in Figure SI1. The SOA mass collected on the filters is given on page 3 line 25 of the revised manuscript.

The author concluded in page 6, lines 20-23 that ROOH do not contribute significantly to the dimer and trimer SOA signals. Then in page 3, line 32, the author described: "vaporizer temperature and ion transfer tubing temperature are set at 200 C."Previous studies have shown that oligomers from alpha-pinene SOA can thermally decompose at 100 C (Hall and Johnston 2012, Williams, Zhang et al., 2016). Because the author heated it to 200 C, would be possible that a lot of oligomers are decomposed to form small ROOH molecules when passing through the vaporizer and the ion transfer tubing, leading to a bias of the current results?

Response: We agree with the reviewer that the high vaporizer and ion transfer tubing temperatures may lead to decomposition of some of the SOA dimers and trimers, and we now make this point in the paper (page 6 line32-33). We note that when we analysed ROOH standards (tert-butyl hydroperoxide, cumene hydroperoxide, 2-butanone peroxide, and ISOPOOH), the effects of the vaporizer and ion transfer tubing tempera-

tures on the ROOH signals were investigated. We found that while the ROOH signals at 100 °C were much lower than those at 200 °C and 300 °C, a significant fragmentation of the ROOH was observed at 300 °C. As a result, we set the vaporizer and ion transfer tubing temperatures at 200 °C throughout the experiments. Of course, we do not know if this temperature does not lead to decomposition of dimeric ROOH species.

References

Hall, W. A. and M. V. Johnston (2012). "The Thermal-Stability of Oligomers in Alpha-pinene Secondary Organic Aerosol." Aerosol Sci. Technol. 46(9): 983-989. Williams, B. J., et al. (2016). "Organic and Inorganic Decomposition Products from the Thermal Desorption of Atmospheric Particles." Atmos. Meas. Tech. 9(4): 1569-1586.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-400, 2018.