

Interactive comment on “The relative importance of competing pathways for the formation of high-molecular-weight peroxides in the ozonolysis of organic aerosol particles” by M. Mochida et al.

Anonymous Referee #1

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General comments: Mochida, et al., investigate the relative importance of product formation pathways following the ozonolysis of methyl oleate (MO) particles. This investigation adds to the growing body of work concerning processing of organic compounds within the particle, is timely, and within the scope of Atmospheric Chemistry and Physics Discussions. Processing of organics in particles has recently been the subject of intense interest in the aerosol community. These reactions serve to change the chemical composition of these particles and, in doing so can alter the physicochemical properties of the aerosol such as their ability to serve as cloud condensation nuclei. This investigation focuses on the fate of the Criegee intermediate species formed following decomposition of the primary ozonide of MO in different particle types. MO was

mixed at various molar ratios with unreactive dioctyl adipate (DOA) and, in separate experiments, with reactive myristic acid (MA) to determine what effect the presence of various functional groups has on product distribution. One of the advantages of this work is the use of MO as opposed to oleic acid, which has historically been used to serve as the model particle in such studies. The use of MO lends clarity to the results by removing potential formation of products through polymerization reactions and drives product formation through established mechanisms, the products of which are well known. In the end, this work provides needed qualitative and quantitative information on the fate of SCI species in particles formed following the ozonolysis of unsaturated compounds in different particle types.

Specific comments: 1) p. 7152, l. 2: When discussing the fate of SOZ1, there is discussion that SOZ1 was not observed in the particles, but could be present below “our detection limit”. I did not find any information on what the detection limit is for the different product types or how that detection limit was evaluated. Was a detection limit of the AMS determined in the analysis of these product types? If so, provide details as to what that limit is and how it was determined. 2) Section 3.6, Assessment of the relative importance of competing reactions. It would be helpful for the authors to add more commentary on the comparison of experimental modeling results. For example, as a result of this comparison, the authors state that $k_2:k_1$ can be contained between 0.3 and 3 for mixing ratios less than 0.5. This spans a wide range of values where k_2 can be less, equally, and more important to product formation than k_1 . I would like to see the authors add more interpretation as to the overall significance of this comparison. 3) Consistency should be maintained between figures and text when referencing ion fragments in the text. In some locations, ion fragments are labeled M-X, while in other locations (and figures), they are labeled $[M-X]^+$. Ion fragments should be consistently labeled in the text as $[M-X]^+$. Specific locations where this needs to be corrected are listed below.

Technical corrections needed: 1) nm s^1 needs to be changed to nm s^{-1} at the following

locations: p. 7144, l. 20; p. 7148, l. 13; p. 7148, l. 22. 2) change ion fragment references to [M-X]⁺ p. 7149, l. 20-26 p. 7150, l. 1-9 p. 7151, l. 28 3) p. 7154, l. 9: “t%” needs to be changed to w%

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 7137, 2006.

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