

The work by Xu et al. investigated the heterogeneous OH oxidation of one α -Pinene derived organosulfate (i.e., $C_{10}H_{17}O_5SNa$, α pOS-249), and both reaction kinetics and mechanisms are well studied and discussed. This is an interesting work that uses a structure–activity relationship (SAR) to assess which carbon site is more favorable for hydrogen abstraction in reactions of OH radical with α pOS-249, further confirmed by the products measured. The experiments, model predictions, results, and conclusions are sound and well described. Therefore, this work could be published nearly as is. Before the publish, there are several minor comments the authors may consider.

General comments

1. Methanol is a common solvent used for MS analysis. However, it should be careful that many SOA constituents such as carbonyls and carboxylic acids undergo chemical reactions with methanol during extraction, storage, and possibly during the electrospray process (Bateman et al., 2008). The influence of methanol may be little on the results of this study, but it is better to give some explanations here.

Specific comments

1. Page 2 Line 16: Some supported references were suggested to be added here.
2. Page 5 Line 25: were \rightarrow was
3. Page 18 Lines 13-14: Is it possible that inorganic sulfate was formed from the hydrolysis of organic products instead of a direct formation?

Bateman, A. P., Walser, M. L., Desyaterik, Y., Laskin, J., Laskin, A. and Nizkorodov, S. A.: The effect of solvent on the analysis of secondary organic aerosol using electrospray ionization mass spectrometry, *Environ. Sci. Technol.*, 42(19), 7341–7346, doi:10.1021/es801226w, 2008.