EGUsphere, referee comment RC2
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Review of egusphere-2022-1068

Anonymous Referee #2

Referee comment on "SO_2 enhances aerosol formation from anthropogenic volatile organic compound ozonolysis by producing sulfur-containing compounds" by Zhaomin Yang et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-1068-RC2, 2022

General comments:

This paper describes the enhancement of aerosol formation in the presence of SO_2 during cyclooctene ozonolysis. The composition of the formed SOA was investigated by means of ATR-FTIR and LC-MS/MS and the authors found that the enhancement was largely attributed to the formation of H_2SO_4 and organosulfates (OSs). By using high-resolution MS/MS, the molecular structures of many OSs were proposed in this work. I think that this study was well-conducted and that the data presented here are valuable for the understanding of the SOA formation. In addition, the paper is generally well-written. I recommend this paper to be published in Atmospheric Chemistry and Physics after the authors' consideration of my minor comments detailed below.

Specific comments:

- Page 4, Section 2.1: It is better to show the rate constant for the reaction of cyclooctene with O_3.
- Page 5, Table 1: There is no information about the reaction time. Is it 300 min? I guess that the reaction of cyclooctene with O_3 was completed within several minutes. Why did the authors measure for such the long reaction time?
- Page 17, Lines 383â□□387: In Hawkins et al (2010), an absorption band at 876 $cm^{â□□1}$ was mentioned for organosulfates. There is no mention about an absorption band of organosulfates in Coury and Dillner (2008). How did the authors attribute absorption bands at 1413 and 1095 $cm^{â□□1}$ to organosulfates? Is there any additional evidence?
- Page 21, Figure 6: In this figure, the formation of many kinds of compounds having hydroxy groups is proposed. Actually, many of ion signals obtained by LC-MS/MS were

assigned to compounds having hydroxy groups. But it seems that the peak of alcohol-COH in the ATR-FTIR (3500â□□3200 $cm^{â□□1}$) is quite smaller than that of carbonyl at 1702 $cm^{â□□1}$. Is it reasonable?

- Page 22, Figure 7: I think that the calculation of DBE (eqn. (1)) cannot be applied to organosulfates. I think that the DBE of precursors of OSs is meaningful.