

Atmos. Chem. Phys. Discuss., referee comment RC1
<https://doi.org/10.5194/acp-2022-127-RC1>, 2022
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Comment on acp-2022-127

Anonymous Referee #1

Referee comment on "Chemical composition of secondary organic aerosol particles formed from mixtures of anthropogenic and biogenic precursors" by Yunqi Shao et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-127-RC1>, 2022

It is interesting to determine the chemical composition and interactions during SOA formation in mixed VOC systems (photooxidation of α -pinene, isoprene, o-cresol and their binary and ternary mixtures in the presence of NO_x and ammonium sulphate seed particles) by using non-targeted LC-Orbitrap MS. The method is innovative. But more detailed information about the methods can be provided.

Introduction:

- What are the pros and cons of using non-targeted LC-Orbitrap MS analysis for data interpretation can be addressed?

Method:

- There are lots of anthropogenic VOC precursors, why o-cresol was chosen as an anthropogenic precursor in this study?
- Humidity and temperature are important factors for SOA formation, they are controlled by the humidifier and by controlling the air conditioning during the experiment. These parameters should be added in the manuscript.
- Why was the mass concentration of seed particle doubled in single isoprene experiment?
- How many repeated experiments performed in each experiment type?
- Before filter sampling, any denuder was used to remove VOCs, NO_x and oxidants?

Results and discussion:

- Online data from gas chromatography mass spectrometer (GCMS), condensation particles counter, differential mobility particle sizer (DMPS) and aerosol mass spectrometer (AMS) are very useful for data interpretation. But the results were not reported in this study.
- Lots of data were presented in this study, (e.g. number of detected SOA compounds, molecular composition, compositional analysis). The novel part of this study is about the unique-to-mixture products due to the interactions between VOC products. This section can be extended and provide more mechanistic understanding of their formation.