Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-420

Anonymous Referee #1

Referee comment on "Combined application of online FIGAERO-CIMS and offline LC-Orbitrap mass spectrometry (MS) to characterize the chemical composition of secondary organic aerosol (SOA) in smog chamber studies" by Mao Du et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-420-RC1, 2022

Du et al. combined online FIGERO I-CIMS with offline LC-orbitrap MS to measure products from a-pinene oxidation. They compared the chemical composition measured by the two instruments, performed hierarchical clustering based on temporal behaviors, and compared volatility using CIMS partitioning measurements and structural information derived from LC-orbitrap MS. The combination of the two techniques provides insights into structures, isomer information, and uncertainties in vapor pressure estimations. The manuscript is generally well written with clear presentation of the results. I recommend publishing the manuscript after a minor revision. My comments are listed below:

- It is unclear from the manuscript what OH source the authors used.
- Did the authors report both iodide clustered species and de-clustered species? In Table S2-S4, there are some open-shell products. This makes the reviewer wonder if those open-shell products were formed in the chamber or just de-clustered species in the instrument.
- Did the authors observe any delay of signals due to losses to tubing or IMR surface (especially for sticky compounds) in the onset period? Would the delay affect the shape of the time series and thus affect the hierarchical clustering?
- What were the differences in mass loadings of materials collected on the FIGAERO filter vs on the LC filter due to the difference in collection time? Could any of the differences in composition (e.g., high carbon number compounds) be explained by a lower loading that is close to the detection limit in the CIMS?
- The reviewer suggests that the authors include a figure to show the time series of the precursor in the experiment. It will be useful to know the decay of the precursor along with the formation of products to understand first-gen vs later-gen products.