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Comment on acp-2020-1294

Anonymous Referee #2

Referee comment on "Measurement report: Online measurement of gas-phase nitrated phenols utilizing a CI-LToF-MS: primary sources and secondary formation" by Kai Song et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-1294-RC2, 2021

This manuscript described the composition, variation, and sources of gas-phase nitrated phenols in Beijing during winter 2018. A box model was used to simulate the formation of nitrophenols. A NMF model was used to determine the primary sources of nitrophenols. Given the ubiquity of nitrophenols and the potentially important roles they play in influencing climate, this manuscript will be of interest to the atmospheric chemistry community. However, substantial revisions need to be made before this manuscript can be considered for publication.

- In general, I found the writing quality of the manuscript very poor. There were many parts of the manuscript where inappropriate words/terminology were used (e.g., “vicarious peaks” on line 238). There was also inconsistent use of tenses and punctuations. The poor writing made the manuscript very difficult (and frustrating) to read and understand. The writing has to be improved substantially. I strongly recommend the authors get someone with strong writing skills to help them improve the manuscript.
- It was not clear from the manuscript whether calibrations were performed throughout the study or only at the beginning/end of the study. If calibrations were only performed at the beginning or end, how can the authors be sure that the sensitivity of their instrument was the same throughout the study?
- Why was only one nitrophenol used for calibration? I don’t think this is appropriate since different nitrophenolic compounds will have different CIMS sensitivities. Have the authors done other calibration tests to determine how the sensitivities of nitrophenolic compounds can differ? Uncertainties in the quantification of ambient nitrophenols may have contributed to the differences between their ambient observations and model predictions.
- How can the authors be sure that the seven peaks they tracked were nitrophenols? The MS instrument only provides the m/z, not the molecular structure. Were nitrophenols also detected by the GCMS?
- More information on the box model needs to be provided. For example, what branching ratios and rate constants were used in the model? Do the authors have any idea which reaction pathways are currently missing in their box model that may have contributed to differences between their ambient observations and model predictions?