

Comment on acp-2021-67

Anonymous Referee #2

Referee comment on "Increase of nitrooxy organosulfates in firework-related urban aerosols during Chinese New Year's Eve" by Qiaorong Xie et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-67-RC2>, 2021

General comment:

This manuscript characterized nitrooxy-OSs in urban aerosol at a molecular level using Fourier transform ion cyclotron resonance mass spectrometry. The authors found that fireworks have substantial effects on nitrooxy-OS formation especially in nighttime and they provided significant information about the sources, classification, and physiochemical properties of nitrooxy-OSs. Overall, the paper is written well, and the results is of great importance for nitrooxy-OS study. However, the abstract and summary need to be improved. I recommend this paper to publish at *Atmospheric Chemistry and Physics* if the authors can account for the following comments.

Specific comments:

- P1, lines 23-25. It is well known that SOA could be generated from the atmospheric oxidation of both anthropogenic and biogenic VOCs. This sentence should be rewritten to highlight the result of the current work. In addition, the authors should demonstrate the impacts of nighttime chemistry and firework on nitrooxy-OSs formation in the abstract to response the title of this manuscript.
- P2, line 23. Please provide a definition about high-molecular-weight compounds.
- P3, line 8. Please note the manufacturer and model of the aerosol sampler.
- P3, line 16. The authors highlighted the ultrahigh resolution of FT-ICR MS. Please show the specific value of MS resolution in the manuscript.
- P3, line 19-25. Please supply more information about the MS data analysis.
- P4, line 2. As mentioned in the introduction, organonitrates that are more likely formed by nighttime chemistry instead of daytime reactions are important precursors for nitrooxy-OSs. Here, the results were derived from the combined influences of nighttime chemistry and fireworks. The focus of this study is to explore the impacts of fireworks on nitrooxy-OS formation. Why not analyze the particles (such as the sampler LNY N) collected in nighttime without fireworks?

- P4, line 9-10. A number of nitrooxy-OSs were only observed in sample NYE N, and these nitrooxy-OSs were suggested to be formed from the chemistry of firework-derived precursors. Did primary nitrogen- and sulfur-containing compounds emitted directly from fireworks contribute to the high number of nitrooxy-OSs in NYE N?
- P6, lines 8-9. What does this sentence mean?
- P6, lines 10-12. Please cite references.

Technical corrections:

- P3, line 16. Electrospray ionization (ESI).
- P7, line 20. S6(h).