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Comment on acp-2021-67

Anonymous Referee #1

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-RC1>, 2021

In this manuscript, Xie et al measured the nitrooxy-organosulfates (nitrooxy-OS) in the aerosols during Chinese New Year Eve and aimed at discussing the impact of firework on nitrooxy-OS formation. The paper is well written and in general intriguing. It provides unique information on the molecular characterization, classification and precursors of nitrooxy-OS in ambient aerosols during firework events. This information will help us better understand the formation pathways of nitrooxy-OS and importance of nighttime chemistry/aqueous chemistry under ambient conditions. Therefore, I recommend publication of this manuscript as long as the following concerns are properly addressed.

1. The title emphasizes "impact of firework", but there is no discussion on "firework" in the abstract part at all. It seems that "impact of firework" is not the whole story of this paper. Either of the title or the abstract should be revised accordingly for consistency of the paper.

2. Nighttime chemistry is one focus of this manuscript. Can the authors provide more information (e.g., meteorological condition, NO_x/O₃ concentrations, and if possible, VOC and aerosol chemical composition) to support their discussion on nighttime nitrooxy-OS formation during the focused time period?

3. Although presented in the table and figures, little discussion is made on the comparison between LNY D and LNY N. It is suggested that a few sentences discussion is added to show the unique situation of firework during the NYE N.

4. From Figure 3, it can be concluded that all nitrooxy-OS categories are enhanced during NYE N. So what category is driven by the firework emission, and what is mainly due to the enhancement of nighttime chemistry? The current discussion is not clear enough.