Review of "Characterization of nighttime formation of particulate organic nitrates based on high-resolution aerosol mass spectrometry in an urban atmosphere in China" by Yu et al.

This study used an HR-ToF-AMS to investigate the particulate organic nitrate (pON) in Shenzhen, China over one-year measurement. The authors applied two methods (i.e., NO^+/NO_2^+ ratio and PMF analysis including NO^+ and NO_2^+ ions) to estimate the concentration of pON nitrate. The fractions of pON in total nitrate in different seasons are reported. Further, it is concluded that biogenic VOCs+nitrate radical is the major source of pON, even though the sampling site is located in polluted urban area. The topic is of interest to the community. Overall, the results are clearly presented and consistent with previous studies. My major concern is that this paper is scientifically correct, but not obviously a significant advance in the field. This study mirrored the analysis procedure from previous publications, but did not emphasize the unique contribution to our knowledge on pON. One interesting point to expand discussions on, as the authors briefly discussed, is that pON concentration in this study is similar to that in the southeastern U.S., a region with lower NOx. A deeper investigation on this comparison may reveal whether the pON formation is VOCs- or NOx-limited across different regions. It is also helpful to contrast to the pON concentration in Europe [*Kiendler-Scharr et al.*, 2016], where the NOx is likely comparable to that in this study. In addition, the diurnal variation of pON (i.e., the increase near 3am) is another interesting point to explore. Overall, I recommend publication after major revision.

Other Comments

1. The diurnal trends of PMF factors should be included. Please add the diurnal trend of LO-OOA in Figure 5.
2. Cautions are required when using the method in section 3.3 to estimate the pON formation. To investigate the sources of measured pON, what is really required is the reacted amount of VOCs. The calculated pON, on the other hand, is based on the measured VOCs existing in the atmosphere. Thus, the calculated pON is not directly comparable to measured pON. This analysis can only serve as a ballpark estimation. The conclusion that biogenic VOCs + NO3 is the major source of pON should be toned down.
3. Figure 3. What is "NO3,org1_ratio"?

4. Figure 5 and Line 209. What causes the pON increase near 3am?

5. Line 31. Please add reference to support this statement. Replace “recognize” with “recognized”.

6. Line 99. NO, NO_2, NO_{ON}, and $NO_{2,ON}$ need superscript “+”. This should be revised throughout the manuscript.

7. Line 131. How is the SA calculated?

8. Line 149. As a sanity check, are NO^+ and NO_2^+ exclusively apportioned into NIA in winter?

9. Line 197. It should be section 2.4, instead of 2.3.

Reference

Kiendler-Scharr, A., et al. (2016), Ubiquity of organic nitrates from nighttime chemistry in the European submicron aerosol, *Geophysical Research Letters*, *43*(14), 7735-7744, doi:10.1002/2016GL069239.