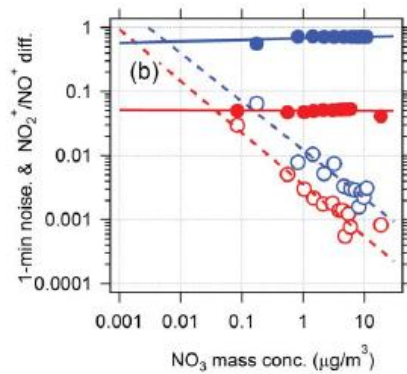


Comments on "Development and validation of a NO_x^+ ratio method for the quantitative separation of inorganic and organic nitrate aerosol using CV-UMR-ToF-ACSM" by Nursanto et al.

The manuscript presents a detailed analysis of the NO_x^+ ratio method for apportioning organic and inorganic nitrate aerosols using a capture vaporizer (CV) in the Aerosol Chemical Speciation Monitor (ACSM). The study involves three main components: revising the fragmentation table to enhance nitrate detection, evaluating the NO_2/NO ratio for source apportionment, and applying this method to both real-world and chamber data. With more and more CV-ACSM being used, the clarification on the organic/inorganic nitrate will improve the understanding of this topic. In general, the manuscript is well-written and organized. After reading through the whole manuscript, I outline several concerns, along with suggestions for improvement.

- 1) The revised table's performance should be tested in various settings to ensure its broad applicability. The authors obtained the slope for the fragmentation table to correct nitrate at m/z 30 and 46. However, the author never showed the verification of this method with real ambient data. E.g. Hu et al. 2017 demonstrated a better agreement on the total nitrate between SV and CV after UMR fragmentation revision in a biogenic-dominated area. How about this revision in the urban or rural areas, as well as the chamber studies?
- 2) Are there more RoR ratios reported in the literature literature? In SV, Doug et al. (2022) checked a variety of literature to determine the final RoR ratio.
- 3) Potential nitric acid formation under high humidity should be addressed to ensure accurate results. Line 250, the authors conducted the chamber study at RH around 90% with NO_3 radical. there will be a formation of nitric acid. Note that even in the absence of NH_3 , nitrate acid can still be formed under high RH with N_2O_5 . How did the authors exclude the inferences of nitric acid to the $\text{NO}_2^+/\text{NO}^+$ ratio determined by organic nitrate in this study?
- 4) The applicability of the NO_x ratio method at specific concentration levels should include considerations of organic nitrate fractions and averaging times. In section 5.2, the authors declared the NO_x ratio method can be used for total nitrate concentration at $0.6 \mu\text{g m}^{-3}$ and above, which is misleading. The sole detection limit of NO^+ cannot determine the limited usage of this method. I think Figure 4 gives a more comprehensive overview of this method. The usage of the NO_x ratio method was also limited by the fraction of pON in total nitrate and averaging time; this should be mentioned clearly in the main text main text, as well as shall be revised in the abstract and conclusion. For, In the urban area, where the fON accounts for 10% or even less, the CV-AMS at 10 min resolution cannot be used.
- 5) Have the authors tried to determine the detection limits of NO_3 using the NO_x ratio using the method below, which is obtained in Fig. 2 in Hu et al. (2017)? Their work is for HR nitrate. Will this method lead to similar detection limits of total UMR nitrate with what was obtained in this study?

| | | | |
|--------------|-------------------------------------|--|-------------------------------------|
| 1-min. noise | $\text{NO}_2^+/\text{NO}^+$ | $\text{NH}_4\text{NO}_3\text{-NO}_2^+/\text{NO}^+$ | RONO_2 |
| CV: | ○ | ● | ● |
| SV: | ○ | ● | ● |



- 6) Line 350, I do not understand why authors only point out a fraction of 17%. In most of the urban areas, the pON fraction in total nitrate is less than 15%.
- 7) There are too many acronyms. A summary of the abbreviations and their corresponding full names in an appendix table improve manuscript accessibility.

Hu, W., Campuzano-Jost, P., Day, D. A., Croteau, P., Canagaratna, M. R., Jayne, J. T., Worsnop, D. R., and Jimenez, J. L.: Evaluation of the new capture vaporizer for aerosol mass spectrometers (AMS) through field studies of inorganic species, *Aerosol Sci Tech*, 51, 735-754, 10.1080/02786826.2017.1296104, 2017.