

Interactive comment on “Measurements of higher alkanes using NO⁺PTR-ToF-MS: significant contributions of higher alkanes to secondary organic aerosols in China” by Chaomin Wang et al.

Anonymous Referee #4

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General comments:

This work is a nice, extensive manuscript using an NO⁺ CIMS (see below) to measure ambient alkanes in the PRD of China and evaluate their importance to SOA chemistry. The experimental methods are high quality and very well-documented. The importance of this manuscript is high, and I find it to be novel and useful.

It is, however, difficult to understand in places and suffers from some lack of precision in language. I recommend publication after these relatively minor, but common issues are fixed.

Specific comments:

Instrument name: The title of the paper and description of the instrument is not correct. PTR is a widely used term that refers to the transfer of a proton from H_3O^+ under controlled conditions. NO^+ ionization uses different ionization mechanisms, particularly charge transfer. I understand the instrument is a commercial PTR-MS, but the authors are now using a different reagent ion and the authors should change the name to something like NO^+ ToF-MS or NO^+ CIMS. Analytical chemistry acronyms are confusing enough as it is. Removing all meaning from them will make them unintelligible to everyone.

SOA Yields: There would appear to be a large amount of possible error in these measurements and calculations and it needs to be reflected when yields (SOA production) are displayed across the paper. Some yield calculations are presented with errors and some are not. Figure 7 and 8, in particular have issues with this.

P2 L29: Is it novel? This method has previously been published (with GC comparisons) by some of the co-authors of this paper in Koss et al.

P12 L280: Is this really a surprise? Why? Do those references use different yields or inputs than this work?

Figure 1: The mass-to-charge labels on the top of the graph are entirely illegible and the labels on the axes are too small to be conveniently legible. Please make larger. I understand that the authors used the default Tofware labels, but "IndivHRfitCurves" will not mean a lot to most readers. Please change the labels to something clearer in each graph.

Figure 5 gives the impression that the authors suggest the dominant source of alkanes in the region is diesel vehicles. Is that correct? If not, I'm not sure I understand the point of putting those traces on the graph with ambient measurements.

Figure 7a needs error bars on the calculated SOA yields. There would appear to be a large amount of possible error in these measurements and calculations and it needs to

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be reflected when yields are displayed in this work

Technical corrections:

P4 L80: should be “is responsive” P4 L82: Not PTR-MS. See above. P4 L88: “in more detail.” P5 L102: See above. Not PTR-MS P5 L110: “mass resolving power” instead of resolution P5 L111: “source” P15 L343: “While. . .” this sentence needs to be re-written for grammatical clarity

Many small language clarity issues throughout the manuscript.

References:

Koss, A. R. et al. Evaluation of NO⁺ reagent ion chemistry for online measurements of atmospheric volatile organic compounds. *Atmos. Meas. Tech.* 9, 2909–2925 (2016).

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