

Comment on acp-2022-468

Anonymous Referee #1

Referee comment on "Comprehensive characterization of particulate intermediate-volatility and semi-volatile organic compounds (I/SVOCs) from heavy-duty diesel vehicles using two-dimensional gas chromatography time-of-flight mass spectrometry" by Xiao He et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-468-RC3>, 2022

He et al. reported the the emission factors of the particulate intermediate and semi-volatile organic compounds by the heavy-duty diesel vehicles, using the two-dimensional gas chromatography time-of-flight mass spectrometry. The authors discussed the volatility distribution of the grouped 21 categories from different driving conditions and discussed the gas and particle phase distribution. The speciated data from the vehicular emission sources is useful for understanding the ambient environmental data, where locational specific source profiles are quite limited. Thus, I would suggest the publication if the author can address my following comments:

- The abbreviation of ISVOCs and SVOCs in the title should be specified.
- Line 30: "EF" should be defined.
- Line 69: it should be "sub-cooled liquid vapor pressure"
- Lines 83-84, the sentence "Particulate I/SVOCs at ascending speed stages are collected and analysed separately" is a repeat to line 79-80, please revise the statement.
- Line 101: revise "duplicated" to "repeated"
- Line 106: repeated words of "'monitored collected".
- Line 117: "Field blank samples are collected collocated at the upstream of the emission pipeline". This sentence is grammatically incorrect, please revise.
- Line 120: "A total of 36 filter samples plus 3 field blanks were collected..." please specify the detailed sampling information, e.g., how many samples from the non-(DPF + DOC) vehicles, etc.?
- Lines 145 and 146: revise "Nest" to "Next"; "elusion" to "elution".
- Line 151-155: the specific molecular information of the quantified species should be specified, maybe in the supporting information. For example, what is the carbon range of the measured alkanes, alkenes, cycloalkanes, and hopanes, etc.? The information is necessary as the g-p partitioning are highly associated with the intrinsic chemical properties of the compounds. Besides, the naming of the 4-ring PAHs₂₀₂ and 4-ring PAHs₂₂₈ looks weird, and it is not consistent in the main text and in the legend of Figure 2.
- There is a negative value of removal efficiency of gas phase data for 4 ring PAHs in Table S2, please check.

- Line 197: what does the "Mono-aromatic compounds" refer to, as it is not within the 21 categories? Is it alkyl benzenes? Please specify.
- Figure 1. I'm confused why there are only six data point for each category, while the sample numbers are 36?
- What is the "O-I/SVOCs"? the definition should be given.
- Figure 5, the babel ">0.3, >0.4 and >0.5" should be presented on the x-axis, current format is not clear.
- Line 297: "However, the vapor loss to the Teflon surface has long been a concern, especially in smog chamber community". Does the author mean Quartz?
- Lines 298-300: "OA concentration in the tailpipe is orders of magnitude higher than that in the ambient air even after the dilution in the CVS system, which would facilitate partitioning to the particle phase." This statement seems not consistent with the results shown in Figure 6, where most of the measured I/SVOCs are in the gas phase, not in the particle phase.
- Has the author measured the total OA concentration? If you did, you can try to model the g-p distribution using Pankow absorption theory (Pankow, 1994), and to see if it can explain the gas-phase dominant results for the I/SVOCs. And also, why the phase distribution of hopanes is distinctly different between non-(DPF + DOC) vehicles and (DPF + DOC) vehicles, any particular explanations?Reference: Pankow, J. F. (1994). An absorption model of gas/particle partitioning of organic compounds in the atmosphere. Atmospheric Environment, 28(2), 185-188.