Atmospheric Chemistry and Physics Discussions

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Comment on acp-2022-587

Rolf Sander (Referee)

Referee comment on "Measurement of Henry's law and liquid-phase loss rate constants of peroxypropionic nitric anhydride (PPN) in deionized water and in *n*-octanol" by Kevin D. Easterbrook et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-587-RC2, 2022

Easterbrook et al. measured Henry's law constants and liquid-phase loss rate constants of PAN and PPN. The manuscript is well-written, and I recommend publication in ACP after several minor issues have been dealt with.

- I think the introduction is too long. In particular, I don't think it is necessary to discuss the enthalpy and entropy of solvation, as they aren't even used in the rest of the manuscript. It should be sufficient to say that the parameters A_H, B_H and C_H are used to describe the temperature dependence.

- Please specify what temperature and pressure you are referring to when you use "sccm". There are many so-called "Standard" values, see https://en.wikipedia.org/wiki/Standard_temperature_and_pressure and https://en.wikipedia.org/wiki/Standard_cubic_centimetres_per_minute

- Line 125: FEP should not be called "Fluorinated ethylene propylene teflon" because it is not teflon.

- Line 138: The recommended symbol for gas-phase mixing ratios (mole fractions) is x, not c.

- Line 153: I would call the step from Eqn. (5) to Eqn. (6) an integration, not a rearrangement.

- Line 160: The quantity in Eqn. (7) should be called a "ratio", not a "fraction".

- Eqn (7): The factor "L" in this equation makes sense only if [X]_l and [X]_g are defined in a suitable way. Most likely, [X]_l refers to the volume of the air parcel, not to the liquid volume. Please provide the definitions of [X]_l and [X]_g.

- Line 238: Why is a different definition of the liquid water contents used here than in Eqn. (7)? For consistency, I suggest to use only one version of the liquid water contents.

- Line 304: I suggest to replace "have units of years" by "are on the order of years". The unit chosen for a quantity doesn't say anything about its magnitude.

- Line 318: Change "This work has shown the H constants..." to "This work has shown _that_ H constants..."

- Data availability: ACP requests depositing data in reliable public repositories. I don't think that providing data data upon request is sufficient:

"Copernicus Publications requests depositing data that correspond to journal articles in reliable (public) data repositories, assigning digital object identifiers, and properly citing data sets..."

(https://www.atmospheric-chemistry-and-physics.net/policies/data_policy.html)

- Figs. 5 and 6: If your plot program allows it, it would be nice to add a second x-axis at the top of the plot, showing T in addition to 1000/T.

- Tab 1: It should be mentioned that, unlike the other entries in this table, Burkholder et al. (2020) is a literature review.

- Tab 1: Since calculated data from Raventos-Duran et al. are already shown in Fig. 5, I think that they should also be mentioned in Tab. 1.

Note that there is another publication with calculated Henry's law constants, including PAN and PPN: 10.5194/acp-17-7529-2017

- It is nice to see that the authors are following the new IUPAC recommendations. However, a very minor comment is that lower case superscripts should be used for c and p because these are the symbols for concentration and pressure, respectively.

- The Engauge Digitizer is not sorted alphabetically in the list of references.