

***Interactive comment on* “Technical note:
Determination of binary gas phase diffusion
coefficients of unstable and adsorbing
atmospheric trace gases at low temperature –
Arrested Flow and Twin Tube method” by Stefan
Langenberg et al.**

Anonymous Referee #2

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An impressive set of measurements are described in this paper. The authors have thoroughly presented their diffusion coefficient measurements and the theory behind them. The previous work in this area is adequately presented.

Something in the big picture is missing: the application to the laboratory kinetics measurements whose results might depend on the accuracy of the diffusion coefficients (the stated reason for this detailed work, lines 60-62.) How will the results of these new

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measurement capabilities affect previously measured uptake coefficients? It seems that the ClONO₂ and N₂O₅ diffusion coefficients might have the most impact in this regard. A recommended set of L-J parameters for these two species would be most interesting.

The concerns about the measurements center around these two molecules and the temperature dependencies of the D's. Both N₂O₅'s and ClONO₂'s measured T-dependencies differ significantly from that expected for L-J interactions. While losses were addressed, it seems these anomalous T-dependencies suggest there is more to the story. The indirect detection method for these two species is worth some consideration. Hard to come up with reasons why these two molecules interacting with He and N₂ should not be describable by L-J potentials.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-1050>, 2019.

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