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Atmospheric Measurement Techniques Discussions

Interactive comment on "An experimental technique for the direct measurement of N_2O_5 reactivity on ambient particles" *by* T. H. Bertram et al.

Anonymous Referee #1

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This paper describes a new and interesting type of probe experiment in which real atmospheric aerosol particles are exposed to N2O5 and the uptake parameters measured. As such it is a very valuable addition to our knowledge of these reactions. The authors make quite a good job of assessing the possible uncertainties and errors that could be associated with this method. There are a few issues that need to be resolved about this paper, pending those, I think it should be accepted.

One potential problem with this method, which is common to most probe methods is that the act of adding N2O5 could change the particles acidity because of HNO3 formation. I suggest the authors consider this effect. Perhaps a mass-balance analysis

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could tell you whether or not this could be a large enough effect that it will change γ ?

The authors seem to be coy about revealing the other aspects of this work such as whether of not substantial ClNO2 formation was observed. Also did they look for direct formation of Cl2 as described by Roberts et al., 2008. It would be nice to get a short statement on these issues.

What is the reason for the large difference in uptake between 5% RH and 50% RH is the lab study with malonic acid. It doesn't seem like the 50%RH particles would contain liquid water, so what is causing this effect?

Bertram et al., 2009 – should be referenced as unpublished results.

Section 6.ii Not sure about this, since your residence time is 8 minutes you might not see the effect of a 'pulse'. The reactor is somewhere between well mixed and plug flow. You could determine its characteristics by just turning the N2O5 source on and off slowly ie. a step-function. Have you tried that?

Roberts, J.M., H.D. Osthoff, S.S. Brown, and A.R. Ravishankara, N2O5 Oxidizes Chloride to Cl2 in Acidic Atmospheric Aerosol, Science, 321, 1059, 2008.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 689, 2009.