

Interactive comment on “The effect of varying levels of surfactant on the reactive uptake of N₂O₅ to aqueous aerosol” by V. F. McNeill et al.

Anonymous Referee #1

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Overall, this is a very good paper, describing an important and timely piece of research on the effects of surfactant species on heterogeneous chemistry, in particular, N₂O₅ hydrolysis. The authors present results obtained using a new and potentially very powerful approach - an aerosol flow tube reactor coupled with CIMS for detection of the gas phase N₂O₅ reagent. It should certainly be published after the authors have thought about the points outlined below.

My only substantive comment concerns the discussion on page 32. It is not clear at all how the authors determined the surface coverage; one is left to infer that they assumed that surface coverage is a linear function of bulk concentration. For surfactants this is far from true; in fact, if Fig 4b was plotted as “decrease in GAMMA” vs. bulk [SDS], it

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would strongly resemble the SDS adsorption isotherm. This is exactly how Lawrence et al (2005b) presented the HCl - DCI exchange data cited here. I strongly urge the authors to re-analyse their data in this light.

Other comments: Figures 2 and 4 are formatted too small; it is difficult to make out the different symbols.

Page 19: Mmereki et al {J Phys ChemA 107, 11038-11042 (2003) and Atmos Environ 38, 6091-6103 (2004)} reported a strong influence of organic coatings on aqueous surface reactivity.

Page 22, line 13: is 8.8 M NaCl soluble?

Page 23, line 18: How was the initial concentration determined? Or was this assumed, based on the vapor pressure?

Page 24, line 16: How was the sensitivity determined?

Page 26, line 11: What does “corrected” mean?

Page 26, line 19: Dotted lines are not shown.

Page 27, lines 20-25: Are 80% and 87% significantly different in this experiment? (What error estimate is there on these numbers?).

Page 28, line 19: The authors actually observed a lack of suppression of GAMMA, NOT a lack of signs of surfactants on the surface. Is it possible that bromide ions might play some role?

Page 29, line 19: On what basis do the authors claim “less than 100%”?

Page 29, lines 24, 25: From where did the Henry’s law and k_6 values come?

Page 31, line 9: Ellison et al did not really add to the extensive literature on surfactant properties; an original reference to the “Pockels limit” would be appropriate here.

Page 33, line 1,2: Mmereki et al {J Phys Chem A 107, 2264-2269, (2003)} observed

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changes in ALPHA with sub-monolayer surfactant coverages.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 17, 2006.

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