

***Interactive comment on* “The effect of fatty acid surfactants on the uptake of nitric acid to deliquesced NaCl aerosol” by K. Stemmler et al.**

Anonymous Referee #3

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This paper describes detailed laboratory experiments to determine the effect of surfactant coatings on the reactive uptake of HNO₃ to deliquesced NaCl aerosol particles. The work is novel, of current interest and importance to ACP readership, and the conclusions are well supported by the data. I suggest publication in ACP. I only have very minor comments.

Perhaps the largest limitation of this work is the inability to have a decent measure of the fraction of surface occupied by the organic coating.

However, the authors are forthright in the associated uncertainty, and for the most part the conclusions are independent of this issue.

For example, several monolayers of oleic acid do not inhibit the uptake, while a smaller

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coating of stearic inhibits the uptake by a factor of 10 or more. This is a useful result.

The authors show quite convincingly that the uptake of HNO₃ is not inhibited by oleic acid films, in fact, if anything, the uptake efficiency increases as the oleic film thickness increases. Should we have confidence in the trend shown in figure 6? The uptake initially decreases but then increases with higher oleic acid loadings. Is this trend statistically insignificant?

If the film is less organized, might there be an effect of HNO₃ interacting with the carboxylic acid head group more easily and thus the behavior is similar to the HCl/HBr uptake to alcohols?

Would it not be possible to keep the carbon chain the same and to change the head group so as to investigate possible interactions between HNO₃ and the head group? Have the authors tried other surfactants besides carboxylic acids?

While not relevant for the current manuscript, it would seem the authors could fairly easily make 13-N labeled N₂O₅ and do the same type of experiment which would perhaps be very enlightening in terms of resolving whether N₂O₅ responds differently to organic coatings.

I find figure 4 to be somewhat unnecessary, the results can easily be summarized in words.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 687, 2008.

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