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Interactive comment on "Impact of palmitic acid coating on the water uptake and loss of ammonium sulfate particles" *by* R. M. Garland et al.

R. M. Garland et al.

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We would like to thank Referee 1 for their careful reading of the manuscript and for their thoughtful comments. We have addressed their comment below; their original review is in italics with our response following it.

While this study considers the growth after equilibration (the equilibration time was fixed to 3 mins.), it is reasonable to assume that from a kinetic point of view, the growth rate might be dictated by the film properties (diffusion constant), as shown in other studies. The authors could expand a little on to what degree the changed growth rates could have an impact on CCN processes.

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That is true. It has been suggested that the deliquescence relative humidity (DRH) and efflorescence relative humidity (ERH) will not change with the addition of a coating, but rather the timescale for water uptake will change (Barnes 1986; Chuang 2003). Many studies have found that while the DRH did not change, the growth rate decreased dramatically, with a particle taking up to 90 minutes to fully deliquesce (Andrews and Larson 1993; Wagner et al. 1996; Chen and Lee 1999). This decrease in growth rate could thus greatly impact aerosols ability to act as CCN. We have added a brief discussion of this point in the discussion section and have added the following references.

Reference:

Andrews, E. and S. M. Larson. "Effect of surfactant layers on the size changes of aerosol particles as a function of relative humidity." Environ. Sci. and Tech., 27: 857-865, 1993.

Barnes, G. "The effects of monolayers on the evaporation of liquids." Adv. Colloid Interface Sci., 25: 89-200, 1986.

Chen, Y.-y. and W.-M. G. Lee. "Hygroscopic properties of inorganic-salt aerosol with surface-active organic compounds." Chemosphere, 38, 10: 2431-2448, 1999.

Chuang, P. Y. "Measurement of the timescale of hygroscopic growth for atmospheric aerosols." Journal of Geophysical Research-Atmospheres, 108, D9, 2003.

Wagner, J., E. Andrews and S. M. Larson. "Sorption of vapor phase octanoic acid onto deliquescent salt particles." J. Geophys. Res., 101: 19533-19540, 1996.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2047, 2005.