

Interactive comment on “Interaction of aerosol particles composed of protein and salts with water vapor: hygroscopic growth and microstructural rearrangement” by E. Mikhailov, et al.

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General: This paper presents laboratory studies of the hygroscopic behavior of sodium chloride, ammonium nitrate and bovine serum albumin (BSA) particles and BSA-salt mixtures. A large amount of work has obviously gone into carrying out the measurements and analyzing them. The result is an important paper which sets out standards for other workers in the field. I recommend publication after the few remarks below have been addressed.

Specific comments:

1) Accuracy of RH measurement. It is stated on p. 4763 that the accuracy of particle

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sizing and RH measurements is estimated to be $\pm 2\%$. Does this mean that if you measure an RH of 10%, the error bar is at RH's between 9.98-10.2% ? I suspect not.

2) Accuracy of growth factor measurement. On p. 4763 the accuracy of the diameter measurement is given as $\pm 2\%$. On p. 4775 the relative measurement uncertainty of the GF is given as $\pm 1\%$. How was this determined? Assuming the $\pm 1\%$ is correct, isn't it within the realms of possibility that in Fig. 4 there has been a drift in the system between the hydration and dehydration measurement series which has caused the crosses and the circles to move apart by 0.01 GF-units? In this case, I would not make any conclusions concerning microstructural rearrangement based on Fig. 4.

3) Hypothesis 1. on p. 4778: Particles formed by crystallization are of (near-)cubic shape, regardless of the extent of NaCl supersaturation in the solution from which they crystallize. This is probably true in the sense that the particles have sharp corners. However, looking at the smaller ("irregular") particles in Fig. 6A1, I wouldn't say that they (at least all of them) are just cubes which have somewhat rounded corners (i.e. "between near-cubic and near-spherical") resulting from interaction with water vapor at 35% RH. Instead, elongated shapes can be seen, which probably result from fusion of two or more crystals growing in the drying solution droplet. The probability of having more than one crystal growing simultaneously depends on the extent on NaCl supersaturation in the solution droplet. In this sense the Hypothesis 1. is probably not formulated in the best possible way.

Technical comments:

1) Abbreviations and acronyms are used in scientific papers because of space limitations and/or page charges. Neither is the case in ACP, and therefore the use of excessive abbreviations should be discouraged. Especially abbreviations which are not self-explanatory are irritating and should be avoided. Thus, please do not use the terms H-TDMA mode 1,2,3. The terms hydration mode, dehydration mode and hydration-dehydration mode are self -explanatory and not even that much longer. Also

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terms like SDD, VA, FP etc are not necessary.

2) On p. 4786, 2nd line from the bottom, there's an extra "seems".

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 4755, 2003.

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