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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Calibration and measurement uncertainties of a continuous-flow cloud condensation nuclei counter (DMT-CCNC): CCN activation of ammonium sulfate and sodium chloride aerosol particles in theory and experiment" *by* D. Rose et al.

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This paper presents important aspects for the interpretation of CCNC measurements, and includes an extensive discussion on Köhler models for calculating the critical supersaturations for CCN activation. I have only a couple of comments on the discussion of the particle shape corrections (§3.6 in the paper).

1. NaCl particles have a cube shape and thus a shape correction has to be applied for

comparison of mobility-based measurements with models that typically assume a dry volume-equivalent diameter. Traditionally, people have used a constant shape factor of 1.08 for the cube NaCl particles, and observed differences between predicted and measured hygroscopic growth factors (e.g., Hämeri *et al*. 2001, Gysel *et al*. 2002). From recent HTDMA experiments we have found that a size-dependent shape factor can account for these differences for particle sizes as small as 8 nm. Details of these calculations are included in Biskos *et al*. (2006a).

2. The consensus from the literature is that ammonium sulfate particles are spherical, but as the authors correctly point out, this may not be fully true. In fact, recent experimental evidence suggests that ammonium sulfate particles are slightly non-spherical, having an associated shape factor that ranges from 1.07 to 1.03 as particle size decreases from 500 to 160 nm (Zelenyuk *et al*., 2006). For nanoparticles, the associated shape factor is of the order of 1.02 as estimated by the restructuring of dry ammonium sulfate particles at RH values from 20-60% during the course of HTDMA measurements (Biskos *et al*. 2006b; cf. Figure 6 and associated discussion therein).

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