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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.

D. Rose et al.

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We would like to thank Referee #2 for the positive remarks and constructive comments, which are highly appreciated and will be taken into account upon manuscript revision. Responses to individual comments are given below.

1) Köhler equations

Upon preparing our discussion paper, we had considered and intentionally chosen not to restrict the term "Köhler equation" only to its most fundamental form, but to des-

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ignate also simplified versions as “Köhler equations”. In view of the existing scientific literature, we think that it is neither common nor necessary but would be difficult to constrain the term “Köhler equation” exclusively to one specific form (Seinfeld and Pandis, 1998; Pruppacher and Klett, 1997; Kreidenweis et al., 2005; and references therein).

2) Pitzer-Simonson-Clegg model

As expected, the results obtained with the osmotic coefficient (OS) Köhler model of our discussion paper, which is based on the ion-interaction model of Pitzer and Mayorga (1973), are nearly identical to the results obtained with an activity parameterization (AP) Köhler model based on the Aerosol Inorganics Model (AIM, Pitzer-Simonson-Clegg mole fraction based model; http://www.aim.env.uea.ac.uk/aim/aim.html; Clegg et al., 1998a,b). In the revised manuscript we will include this additional Köhler model and refer to it as AP3 (surface tension and density parameterizations like in the OS model). Over the investigated range of conditions, the differences in supersaturation calculated with the OS and AP3 models is less than 1% (relative) for both ammonium sulfate and sodium chloride. Differences and accuracy of these and other models are further discussed in the response to the short comment of David Topping (ACPD, 7, S4119-S4123, 2007) and will also be addressed in the revised manuscript.

3) Miscellaneous

Indeed Eq. 3 is a very basic form of the Köhler equation, which can be found in many scientific publications. Nevertheless, we considered it appropriate to present it with reference to recent overview papers (Kreidenweis et al., 2005; Koehler et al., 2006), in which some fundamental aspects are discussed in more detail than in our study (e.g., treatment of the partial molar volume of water in the Kelvin term). With regard to volume additivity, we referenced Mikhailov et al. (2004), where this aspect is presented and discussed in more detail.

The sentence on p. 8208, l. 12, will be changed as suggested.

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