

Interactive
Comment

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.

Anonymous Referee #1

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Indeed, no Kohler model was involved in the determination of the B1-B5 parameters in Eq. 16 or A1-A13 parameters in Eq. 15 of Lance et al (2006).

The thermal resistance, as used in Lance et al (2006), is a physically-based parameter, the affect of which is modeled using first principles. Since the thermal resistance is determined by the difference between a modeled and calibrated value, any error that arises for any reason will be lumped into this value. The bottom line in this paper is that

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the thermal resistance of this instrument appears to be very small (with a mean value close to zero, when applying the most realistic parameters in Kohler theory). Any non-idealities in the instrument or operation of the instrument (e.g. insufficient wetting, or a slightly nonlinear temperature gradient), may cause the calibrated thermal resistance to vary and/or deviate from the actual thermal resistance, if not careful. In this case, a deviation from zero will give some negative values. If indeed the thermal resistance is negligible, then you can simply use the applied temperature gradient (minus the offset) to determine the instrument supersaturation.

Again, it is important to realize that the approach used in Lance et al (2006) uses first principles to describe the operation of the instrument. As the parameterizations from Lance et al (2006) do fit the data within the reported uncertainties when consistently applied, and given the fact that the thermal resistance tends to increase over time (realistically, due to scaling on the inside of the column), to say that the thermal resistance is not physical is unjustified.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 8193, 2007.

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