Atmos. Chem. Phys. Discuss., 5, S5132–S5133, 2005
www.atmos-chem-phys.org/acpd/5/S5132/
European Geosciences Union

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Water activity and activation diameters from hygroscopicity data – Part II: Application to organic species" *by* K. A. Koehler et al.

K. A. Koehler et al.

Received and published: 17 January 2006

We have further examined the issue of dry particle shrinkage in the HTDMA and wish to report the new findings. We have modified our evaporation calculation to be consistent with the assumptions used in Bilde et al. (2003), and using the same estimated diffusivities and pure-component vapor pressures. We now find that the calculated evaporation is on the order of the observed size change. Specifically, for malonic acid we find that a 100 nm particle would shrink to 81.2 nm using the vapor pressure in Table 1 or to 86.4 nm using the vapor pressure in Bilde et al. (2003) in 5 s. For glutaric acid, an initially 100 nm particle would evaporate to 90.0 nm using the vapor pressure in Table 1 and 87.7 nm using the vapor pressure in Bilde et al. (2003) in 5 s. The

Full Screen / Esc
Print Version
Interactive Discussion
Discussion Paper

EGU

observed evaporated size was 82 nm for malonic acid and 81 nm for glutaric acid. The glutaric acid evaporation is still slightly underestimated, however, the value in Bilde et al. (2003) is not a function of temperature for this species, so the calculations use the reported vapor pressure at 296 K. The vapor pressures of the other dicarboxylic acids studied are all strong functions of temperature and thus, since our experiments are conducted at 303 K, we believe the observed particle size changes are all consistent with evaporation for the dicarboxylic acids studied. These conclusions have been added to the text. We thank Merete Bilde for her assistance.

Bilde, M., B. Svenningsson, J. Monster, and T. Rosenorn, Even-odd alternation of evaporation rates and vapor pressures of C3-C9 dicarboxylic acid aerosols, Environmental Science & Technology, 37 (7), 1371-1378, 2003.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 10881, 2005.