Geophysical Research Abstracts
Vol. 18, EGU2016-12233, 2016
EGU General Assembly 2016

Properties of meso-Erythritol; phase state, accommodation coefficient and saturation vapour pressure

Eva Emanuelsson, Morten Tschiskale, and Merete Bilde
Aarhus University, Chemistry, Aarhus, Denmark (eva_emanuelsson@hotmail.com)

Introduction
Saturation vapour pressure and the associated temperature dependence (enthalpy ΔH), are key parameters for improving predictive atmospheric models. Generally, the atmospheric aerosol community lack experimentally determined values of these properties for relevant organic aerosol compounds (Bilde et al., 2015). In this work we have studied the organic aerosol component meso-Erythritol.

Methods
Sub-micron airborne particles of meso-Erythritol were generated by nebulization from aqueous solution, dried, and a mono disperse fraction of the aerosol was selected using a differential mobility analyser. The particles were then allowed to evaporate in the ARAGORN (AaRhus Atmospheric Gas phase OR Nano particle) flow tube. It is a temperature controlled 3.5 m long stainless steel tube with an internal diameter of 0.026 m (Bilde et al., 2003, Zardini et al., 2010).

Changes in particle size as function of evaporation time were determined using a scanning mobility particle sizer system. Physical properties like air flow, temperature, humidity and pressure were controlled and monitored on several places in the setup. The saturation vapour pressures were then inferred from the experimental results in the MATLAB® program AU_VaPCaP (Aarhus University_Vapour Pressure Calculation Program).

Results
Following evaporation, meso-Erythriol under some conditions showed a bimodal particle size distribution indicating the formation of particles of two different phase states. The issue of physical phase state, along with critical assumptions e.g. the accommodation coefficient in the calculations of saturation vapour pressures of atmospheric relevant compounds, will be discussed. Saturation vapour pressures from the organic compound meso-Erythritol will be presented at temperatures between 278 and 308 K, and results will be discussed in the context of atmospheric chemistry.

References
Bilde, M. et al., (2015), Chemical Reviews, 115 (10), 4115-4156.
Bilde, M. et. al., (2003), Environmental Science and Technology 37(7), 1371-1378.
Zardini, A. A. et al., (2010), Journal of Aerosol Science, 41, 760-770.