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Atmospheric Measurement Techniques Discussions

Interactive comment on "Design and construction of a simple Knudsen Effusion Mass Spectrometer (KEMS) system for vapour pressure measurements of low volatility organics" *by* A. M. Booth et al.

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1. The authors overlook optical techniques developed to measure low vapor pressures.

Of specific concern for the present work is a novel optical method for evaluation of low vapor pressures of aerosol components depending on ambient conditions: temperature and relative humidity (Zardini et al., Optics Express, 14(15), 2006). This method was applied to calculate solid/liquid state vapor pressures and enthalpy of vaporization of malonic acid. Pressure (malonic, solid)=(4.1 +- 1.6) x 10E-5 Pa at T=298.15 K.

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Interactive Discussion

Discussion Paper

Enthalpy=100 +- 17 kJ/mol.

Recently, the technique was extended to monitor the evaporation of crystals and applied to measure the solid state vapor pressure of succinic acid (Zardini and Krieger, Optics Express, 17(6), 2009). Pressure (succinic, solid)=(5.4±0.2)×10E-5 Pa at T=298.5 K

Please consider adding these references, the vapor pressures, and the enthalpy values to your paper. Consider also updating Fig. 5 and Fig. 6 consequently. In the suggested publications the authors can find references for optical techniques in general, if needed.

2. The authors might want to stress from the beginning the importance of the physical state. Namely, that they measure solid state vapor pressures, even if it becomes clear from the experimental method afterward and from the last sentence in the Conclusion section. In fact, many of the condensed organic compounds in the atmosphere are in a metastable liquid state (Marcolli et al., J. Phys. Chem. A 2004, 108, 2216-2224), and it is the supercooled melt vapor pressure and the equilibrium vapor pressure over liquid surfaces (depending on ambient RH and T) often of interest for partition theory (Pankow, Atmospheric Environment Vol. 28, No. 2, pp. 185-188, 1994). See also: Koponen et al., Environ. Sci. Technol. 2007, 41, 3926-3933; Riipinen et al. J. Phys. Chem. A 2007, 111, 12995-13002.

Please consider adding a short comment where appropriate.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 893, 2009.