



Vapor pressures of a homologous series of polyethylene glycols as a reference data set for validating vapor pressure measurement techniques.

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The production of secondary organic aerosol (SOA) by gas-to-particle partitioning is generally represented by an equilibrium partitioning model. A key physical parameter which governs gas-particle partitioning is the pure component vapor pressure, which is difficult to measure for low- and semivolatile compounds. For typical atmospheric compounds like e.g. citric acid or tartaric acid, vapor pressures have been reported in the literature which differ by up to six orders of magnitude [Huisman et al., 2013].

Here, we report vapor pressures of a homologous series of polyethylene glycols (triethylene glycol to octaethylene glycol) determined by measuring the evaporation rate of single, levitated aerosol particles in an electrodynamic balance. We propose to use those as a reference data set for validating different vapor pressure measurement techniques. With each addition of a (O-CH₂-CH₂)-group the vapor pressure is lowered by about one order of magnitude which makes it easy to detect the lower limit of vapor pressures accessible with a particular technique down to a pressure of 10⁻⁸ Pa at room temperature.

Reference: Huisman, A. J., Krieger, U. K., Zuend, A., Marcolli, C., and Peter, T., Atmos. Chem. Phys., 13, 6647–6662, 2013.