Effect of the Carrier Gas on Vapor Pressure Measurements by the Gas Saturation Technique

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Gas saturation (also known as transpiration) methods for the measurement of vapor pressure typically assume ideal gas behavior. One element of the measurement that is likely to be significantly non-ideal is the interaction of the carrier gas with the vapor of the measured compound. Typically, interaction virial coefficients for such mixtures have not been measured. However, methods for estimating this interaction suggest that the effect could shift measured vapor pressures by 10 % or more, depending on the carrier gas and the measured compound. In this work, we compare the vapor pressures obtained for *n*-alkanes with two different carrier gases, sulfur hexafluoride and nitrogen. This work was done in a "concatenated" gas saturation apparatus that has eighteen saturator-adsorber pairs linked in series. With this apparatus it is possible to make eighteen simultaneous vapor pressure measurements, which greatly speeds data collection and allows for a variety of techniques that ensure data quality.