

Measurement of Gas Mixing Volumes by Flux Response Technology

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Flux Response viscometry has been described before in a series of papers [1-3]. The technique has been successfully applied to ideal mixtures at ambient and high temperatures [4], and to binary and ternary mixtures [5].

Recently, we have extended the range of application of this technique to non-ideal mixtures [6]. In order to achieve this, measurements of viscosity had to be corrected for volume changes upon mixing (i.e. non-ideality), among other effects. The corrections proved to be accurate enough to provide the values of partial molar volumes. A prototype of this new development has already been presented in [7]. However, this prototype was only able to work at ambient temperatures.

In the present work, the initial design has been modified to add proper temperature control and to simplify the corrections. The accuracy of the viscosity measurements has been improved, since the thermal expansivity [7] is no longer required and the temperature at which the mixture takes place is now controlled within 0.02 K.

We report the measurements of the mixing volumes of Helium + Dichlorodifluoromethane mixtures at 273.15 K and 1.1 bar obtained using the improved apparatus. To our knowledge, the mixing volumes of this mixture have not been published before.

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