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**THE CONTINUOUS DILUTION METHOD  
EXCESS THERMODYNAMIC PROPERTIES OF BINARY LIQUID  
MIXTURES CONTAINING HEXAFLUOROBENZENE AND ETHERS**

*by*

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## SUMMARY

The continuous dilution method for the measurement of excess thermodynamic properties of binary liquid systems offers considerable economy in both time and materials when compared with other methods. As such its use has won widespread approval in recent years. This thesis describes the use of three continuous dilution devices, two of which were designed, constructed and tested during this work.

An isothermal displacement calorimeter incorporating some new design features has been built and is described in detail. This device has been tested with two systems for which reliable data of high precision are available and is found to reproduce these data with comparable precision.

Few continuous dilution devices have been described which measure the static vapour pressures of binary liquid systems as a function of composition. Such a device, believed to be of simpler construction than those already present in the literature, is described here in detail. The vapour pressures and excess Gibbs free energies of the system *n*-hexane + benzene have been measured and compare favourably with the results of other workers.

Since 1960 considerable attention has been devoted to the ambiguous behaviour of hexafluorobenzene with electron donors. Little work has been done, however, with donors of *n*-electrons. In this work the excess volumes, enthalpies and Gibbs free energies of binary liquid systems containing hexafluorobenzene and ethers have been measured. These results are also ambiguous but the size, shape and polarizability of the carbon backbone incorporating the donor atom would seem to be of overriding importance in determining the resultant thermodynamic properties of these mixtures.

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