ECTP

PAU 2008

Book of abstracts

18TH European Conference on Thermophysical Properties

http://ectp.univ-pau.fr

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Keywords: material: petroleum fluids, near critical and super critical fluids; property: volumetric properties.

The high-pressure vibrating tube densimeter method along with the Forced Path Mechanical Calibration [1] model is used to measure the isothermal p-r behaviour of the carbon dioxide + propane at 308.15 K and pressures up to $200 \cdot 10^5$ Pa. The compositions cover the whole range of mole fractions. Excess volumes, V^E, which were derived from experimental densities, were well represented by the Patel-Teja (PT) cubical equation of state. Good quality data of high pressure phase equilibrium (critical points, $P\rho T$, VLE, etc.) for pure compounds and mixtures is important to different industries. For example, it is vital for petroleum and natural gas industries, design of chemical reactors, high pressure extraction and separation equipment or assessment of processes involving SCFs. Such data is also the basis for the development of new and improved equations of state (EOS). This work is part of a research to obtain critical and volumetric properties of pure and binary mixtures of substances of such applied and theoretical interest. The aim of this study is to provide experimental information about the volumetric behaviour of the system carbon dioxide + propane, which depends on the composition of the mixture but also on the region p-T where the state of the studied mixture is found. With this target we have measured the densities, r, with a high-pressure vibrating tube densimeter for mixtures with compositions which cover the whole range of mole fractions up to $200 \cdot 10^5$ Pa. As consequence, we have studied the volumetric behaviour of the system in the sub-critical region, close to the critical curve and in the supercritical region. Excess volumes, , were derived from experimental densities and were well represented by the Patel-Teja (PT) cubical equation of state [2].

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Solubilities of Some Pharmaceutical Compounds in Pure Solvents

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Keywords: property: solubility, calorimetry, phase equilibria; material: aqueous systems, biomaterials.

Solubility is an important property which affects the release, transport and absorption of drugs. It also affects drug's efficacy, its future development and formulation effort [1]. Therefore, its measurements must be carried out in an initial step of the drug development. Solubility data involving new drug molecules and their precursors are frequently unavailable, which hampers the development and evaluation of predictive methodologies.

In this work, solubilities of some drugs, such as paracetamol, budesonide, and furosemide, were measured, as a function of temperature, in several solvents, such as water, ethanol and acetone. The shake-flask method was used to obtain the saturated solutions and the compositions were determined by HPLC analysis. In spite of being the most reliable and standard technique to measure solubilities, it is very time consuming and is limited when samples are expensive and available in low amounts. An alternative methodology using differential scanning calorimetry [2] was used, with the advantage of being faster and consuming smaller quantities of sample.

Besides the inherent complexity associated with experimental measurement of drug solubility, the acquisition of reliable results is especially difficult [3]. Therefore, theoretical methods to predict solubilities are fundamental. The NRTL-SAC model [4] was used to represent the measured data. This method provides a simple and practical thermodynamic framework for pharmaceutical companies. A comparison between experimental data and model predictions is shown.

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Experimental density and viscosity data of some vegetable oils

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