Poster SCF3

Experimental Apparatus for the Measurements of Solid-Liquid-Gas Phase Diagrams Constituted by Carbon Dioxide + Solid

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Particle production using supercritical fluids has been studied in the recent years. Experimental data such as the solubility of solids in supercritical fluids and solid-liquid-gas (SLG) phase diagrams are necessary for the design of this process. In particular, SLG phase diagrams are commonly monitored in pressure and temperature where it is indicated the minimum pressure required to melt the solid mixed with the solvent.

Therefore, the aim of this work is to present a static-view apparatus for the experimental measurements of the three-phase solid-liquid-gas diagrams. The studied systems are carbon dioxide + octacosane and carbon dioxide + stearic acid; temperature interval is within the critical temperature for the carbon dioxide and the melting temperature for the solid at atmospheric pressure and up to 35 MPa. The methodology for the measurements is based on the first freezing point reported in the literature. Uncertainties for the recorded variables are ± 0.03 K and ± 0.6% for temperature and pressure, respectively. The experimental data are represented by the Peng-Robinson Equation of State coupled to the classical and Wong-Sandler mixing rules.