

ADVANCES IN DETERMINING THE CLOUD POINT, SOLUBILITY, SWELLING AND CRYSTALLIZATION PROPERTIES OF MATERIALS IN SUPERCRITICAL CARBON DIOXIDE

Kenneth J. James, Ph.D.,*
Supercritical Fluid Technologies, Inc
1 Innovation Way Suite 304 - Newark, DE 19711

David Chesney, Ph.D.,
Michigan Technology University
Chemistry Department
1400 Townsend Drive - Houghton, MI 49931

Jennifer L. Lefler
GlaxoSmithKline
5 Moore Drive - Bldg. 3 RM 4190
Research Triangle Park, NC 27709

Abstract

Direct, visual observation of materials under actual supercritical conditions is an important first step in the development and refinement of supercritical fluid extraction, reaction and chromatographic processes. A specially designed phase equilibrium view cell or "Phase Monitor" is used to observe the dissolution, precipitation, swelling and crystallization of compounds at a wide range of pressures and temperatures. Observations of materials are performed in the supercritical region, under precisely controlled conditions.

The Phase Monitor simplifies the determination of critical point for binary, tertiary or complex mixtures. Through a better understanding of phase behavior as a function of temperature, pressure, and sample concentration, a significant time and cost savings for supercritical process development is realized. Several examples will be presented.