SUPERCRITICAL FLUIDS AND POLYMORPHISM

Joel Bernstein

Department of Chemistry, Ben-Gurion University of the Negev
Beer Sheva, Israel 84105.

Polymorphism – the existence of different crystal structures for a particular compound (or combination of compounds) – is playing an increasingly important role in the development and utilization of new materials. The effort to understand and control polymorphism has been expanding rapidly in the last 20 years or so, particularly in the pharmaceutical industry, since such understanding and control can lead to improved qualities and efficacy of an actively pharmaceutical ingredient (API), as well as opportunities for new intellectual property, extension of patent life on the API, etc.

The search for polymorphs of an API, indeed the general search for crystal forms (solvates, etc.) requires the design of experiments in which the crystallization conditions are varied in order to increase the possibility for obtaining new forms. Crystallization under supercritical conditions has recently become one of the promising techniques to survey the polymorphism/crystal form landscape for new and improved materials.

The use of supercritical CO_2 as a solvent also is a 'green chemistry' route for the crystallization of known materials as well as a medium for the search for new crystal forms.

The talk will provide a survey of the connection between polymorphism – particularly in the pharmaceutical field - and the role that supercritical fluids can play in studying polymorphism in general and in pharmaceutical research and development in particular.