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Presentation

Supercritical fluids are a unique class of process fluids and solvents which display tunable properties. They are employed at conditions beyond the thermodynamic vapor-liquid critical point. At those conditions, properties of supercritical fluids can be changed over a wide range, and adapted to process needs. They are attractive process fluids in combining a set of unique properties like low viscosity, high diffusivity, zero surface tension, and a high compressibility. Water, for example, is used extensively as working fluid in power generation processes, at conditions below the critical point and increasingly at supercritical conditions. Carbon dioxide and ammonia are utilized in a similar way.

Supercritical fluids modify the properties of compounds in mixtures. They dissolve components far beyond their vapor pressure. They dissolve in other fluids and solids, reducing their viscosity and surface tension substantially. In chemical reactions, supercritical fluids act as non-reactive process fluid or take part in the reaction as is the case with water in hydrolysis of biomass components or in oxidative waste destruction. In materials processing, supercritical fluids become effective in modulating miscibility and phase separation conditions leading to formation of materials with a range of different morphologies.

The practical application of supercritical fluids requires understanding of the fundamentals of multiphase equilibria at high pressures and ultimately the design of technical components and plants for production. Compared to other technical systems, supercritical fluid production plants are relatively simple, but the underlying principles are complex and must be thoroughly investigated and transferred to the users.

Significant advances have been made over the past three decades in understanding the interaction of supercritical fluids with natural and synthetic materials for physical and chemical transformations with beneficial end results that offer new and alternative pathways to materials processing. Advances have also been made in the engineering of processes which employ supercritical fluids as process media. One area of special importance that has emerged is “Energy” in terms of the (a) use of supercritical fluids in power generation or refrigeration; (b) use of supercritical

fluids in biomass conversions for biofuel generations; (c) use of supercritical fluids in reducing the environmental footprint of conventional processes; (d) use of supercritical fluids in generating new materials that have improved thermal insulation properties; or (e) use of supercritical fluids or supercritical-fluid based materials in improved separation or property upgrading operations.

A current bottleneck is in overcoming some of the misconceptions pertaining to overall costs and economics of the potential processes in transforming the technology base to large scale implantations. It is with this background that the proposed workshop is being organized.

The workshop will be held in Brazil which is leading in its activity in bio-based alternative fuels and as such is a natural location to address the central topic of Energy. Brazil is also a location where intense activity is taking place in bio-based material processing and will provide a platform to look at the limitations in going from bench top research to industrial implementation.

Thus, we are pleased to announce that the Workshop on Supercritical Fluids (SFE'13) will be held on December 8-11, 2013 in Campinas (Brazil).