

Poster LSH7

Phase Behavior of Ternary Systems: Application to Drug Crystallization in Supercritical CO₂

Samia ABDELLI, Yasmine MASMOUDI, Adil MOUAHID, Evelyne NEAU, Elisabeth BADENS
Aix Marseille Université, CNRS, Centrale Marseille, M2P2 UMR 7340, 13451, Marseille, FRANCE

✉ yasmine.masmoudi@univ-amu.fr

The purpose of this study is to deepen the knowledge of the fluid phase behavior that can be observed during the crystallization of compounds of interest, such as pharmaceutical compounds, in a supercritical medium. The work presented is part of the continuity of the experimental study led by the M2P2 laboratory dealing with the recrystallization of a pharmaceutical compound, sulfathiazole, using the Supercritical Anti-Solvent (SAS) process. One of the most important data for a good description of the fluid phase behavior is the concentration of sulfathiazole (STZ) in the fluid phase composed of a mixture of organic solvent and CO₂, which allows evaluating the global supersaturation of sulfathiazole during SAS crystallization.

A set of experiments was carried out to study the evolution of STZ concentration in the fluid phase using a dynamic method in order to obtain measurable quantities of sulfathiazole by UV-visible spectrophotometry. The measurements were carried out for binary systems (CO₂ –STZ) as well as for ternary systems (CO₂ –organic solvent-STZ). In this latter case, both methanol and acetone have been used with a molar ratio solvent/CO₂ understood between 2.5 and 20%. Experiments were conducted in a 20 mL high pressure cell volume. The molar flow rates have been varied from 0.046 up to 0.127 mol.min⁻¹. Pressure and temperature conditions have been varied respectively between 10 and 20 MPa, 313 and 350 K. Those conditions correspond to experimental conditions used previously for SAS recrystallization of sulfathiazole [1].

Reference

[1] CARENO, S., BOUTIN, O., BADENS, E., *J. Cryst. Growth*, Vol. 342, **2012**, p.34

Keywords

Supercritical carbon dioxide, fluid phase behavior, drug recrystallization, supersaturation, sulfathiazole