

# PROCESSING OF PARACETAMOL-PEG 4000 SOLID DISPERSIONS USING SUPERCRITICAL ANTISOLVENT TECHNOLOGY

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## Abstract

In this work, the applications of supercritical antisolvent recrystallization processes for the preparations of pharmaceutical particles and solid dispersions have been studied. The physical characterization of the binary systems was carried out using X-ray diffraction, differential scanning calorimetry and scanning electron microscopy in order to understand the influence of this technological process on the physical status of the drug.

As a water-soluble and low melting point carrier, PEG 4000 can remarkably increase the rate and extent of dissolution of paracetamol. After PCA process, the dispersion and surface area of low water soluble drug in carrier were increased and so the contact area with solvent was enlarged. The carrier adds the water-solubility of the drug. Therefore the solid dispersion technology is able to increase the dissolution rate and bioavailability of drug.

The studies proved that supercritical fluid antisolvent technology was a viable and alternative method of preparing solid dispersion. The PCA process do not destroy the morphology of the produce. PCA technology can be applied for temperature sensitive drug.

**Keywords:** Supercritical fluids; PCA process; Solid dispersion; Paracetamol

## Crossover SAFT-BACK equation of state for pure CO<sub>2</sub> and H<sub>2</sub>O

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## Abstract

In the paper, the crossover statistical associating fluid theory and Boublik-Alder-Chen-Kreglewski (SAFT-BACK) equation of state (EOS) is established. The system-dependent parameters for pure carbon dioxide and water are regressed and their thermodynamic properties are calculated. Then the classical and crossover SAFT-BACK EOSs are compared. For pure carbon dioxide, their calculated deviations are both small. For pure water, the calculated accuracy with the crossover EOS is better than that with the classical EOS. Other EOSs, such as the SAFT-BACK EOS, the crossover method is not necessarily adopted in industrial calculation for some simple fluids and only for associating fluids the crossover method can give a marked improvement.

Keywords: Crossover theory; Equation of State; SAFT-BACK; Carbon Dioxide; Water