

Poster MS5

Supercritical Carbon Dioxide Extraction for Purification of Polyolefins

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Throughout their lifecycle, polyolefins can be exposed to contaminating media which limit their recyclability, especially in food industry. Supercritical carbon dioxide extraction is used to remove contaminants which can penetrate into polypropylene (PP) and linear low density polyethylene (LLDPE). Two forms of contaminated material are studied : granules and films. Quantitative results for kinetics of extraction have been obtained by gas chromatography. The extraction process can be kinetically controlled by the solubility of compounds in the supercritical CO₂ or by their diffusion through the polymer by means of pressure and temperature conditions. A systematic study of the influence of the form (granules or films) and the thickness of the materials shows that it is possible to increase the speed of extraction with a thinner material : high recoveries (>97%) are obtained with films. After extraction experiments, the potential of supercritical fluid extraction (SFE) was compared to that of traditional liquid extraction with dichloromethane. Finally, the changes of rheological parameters were studied and discussed.

Keywords

Supercritical CO₂, Supercritical fluid extraction, purification, kinetic, polypropylene, linear low density polyethylene, rheology.