

PRELIMINARY EXPERIMENTS FOR THE RECYCLING OF POLYURETHANE FOAMS IN SUPERCRITICAL CO₂

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Abstract

The global production of polyurethane (PU) materials reach millions of tons causing an increasing quantity of wastes disposed in landfills. Therefore, the PU recycling is a need to reduce this environmental problem and the consumption of natural resources. Our research group has achieved the complete recovery of flexible PU foams by a two split phase glycolysis process. However, this process needs an excess of glycol to get a proper viscosity of the glycolysis system and several purification steps. The use of supercritical CO₂ as solvent can reduce the viscosity of the reaction system without using the glycol excess and avoiding a further purification step since it can be removed simply by pressure reduction. On the other hand, varying the CO₂ conditions after the reaction, the different secondary products can be selectively separated leaving the recovered polyol perfectly purified. This way, the process avoids to use an excess of glycol and save space, time and money spent in the purification units. The first step carried out for the development of this process was to determine the CO₂ conditions for the solubility of the PU foam, the corresponding polyol and the secondary products of the glycolysis.
