

This thesis deals with optimization of flexible polyurethane foam recycling with using of natural polyols based on rape seed oil and fish oil and it explores applications of depolymerized polyol product by formulations of new polyurethane materials.

The experiments of depolymerisation showed that both tested natural oil (rape seed oil and fish oil) can be used as effective reagents for polyurethane recycling. Reaction conditions of depolymerisation were optimised with model flexible polyurethane foam and applied on waste foam from real conditions. Gain of depolymerisation is one-phase low viscosity (to 1500 mPa.s) liquid polyol products with content of hydroxyl groups ca 3 mmol/g. These polyols can be used for polymerisation of new materials.

First application of recycled polyols was formulation of polyurethane foam systems. Through optimising of formula was prepared low-density semirigid foam containing 100 percentage of recycled polyol. Properties of these foams correspond to commercial foams.

To prepare of homogenous cast polyurethane system based on recycled polyols it was necessary to add proper solvent, therefore extent of application has been lowered. On that account the systems were tested for study of polyaddition reaction and for following properties of the material. In these tests, the reactivity of both polyols was mutually compared.