



**PUReSmart**

**PolyUrethane Recycling Towards  
a Smart Circular Economy**

# Milestone

MS3 Chemolysis is efficient with  $\leq 0.5$  kg chemolysing agent per kg of PU foam

WP3 – Smart chemolysis - improved chemolytic upgrading for PU containing EoL waste streams

## Project Information

Grant Agreement n°	814543
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## Publishable Summary

This milestone comprises the development of a procedure for the efficient chemolysis of flexible polyurethane foam on 4 g – 0.4 kg PU foam scale. Split-phase alcoholysis allows for the dissolution and depolymerization of polyurethane foam to recover aromatic compounds and the polyether polyol. The procedure should allow for the production of recycled polyether polyol in high purity and yield with limited input of chemolyzing agent and purification treatments.

The small scale alcoholysis of flexible polyurethane foam (4 g) allowed for varying of multiple reaction parameters such as alcoholyzing agent, catalyst and additives. Lactams were found to be performant additives, allowing for a substantial reduction of the alcoholyzing agent input without loss of purity and yield of the recovered polyether polyol. Furthermore, a non-toxic alternative to the state-of-the-art catalysts and alcoholyzing agents were discovered. The split-phase alcoholysis was successfully performed on a larger scale with 400 g foam. The polyether polyol was recovered in high yield (98 %) and high purity (97%).

A procedure for split-phase chemolysis process on a 4 g - 0.4 kg foam scale was thus successfully developed, with recycled polyether polyols of high purity and yield generated by employing new catalysts and alcoholyzing agents. This procedure can also be optimized and upscaled in the further course of the project. The recovered polyether polyols can be further analyzed and tested in the synthesis of new flexible foams.