Monomer Recovery from Biobased Polyurethane (20160238, Dr. Marc Hillmyer)

IP Status: Issued US Patent; Application #: 15/442,829

Polyurethane Synthesis from Biodegradable Polyesterol PMVL

Biobased and chemically recyclable polyurethane (PU) offers a greener alternative to petroleum derived polyols used in the synthesis of thermoplastic polyurethanes, flexible foams and elastomers. A new technique uses renewable and degradable β -methyl- δ -valerolactone (MVL), to create a bio-based PMVL (poly β -methyl- δ -valerolactone) polyol with similar mechanical properties and performance of petroleum-derived PU.

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MVL Monomer Recovery from Polyurethane Foam

Another innovative aspect of this technology is the ability to recycle PMVL foams to recover MVL monomer in high purity and yield. Recycling foam to monomer (instead of polyol) allows the recovered monomer to be polymerized into polyols of any desired molecular weight and functionality. Furthermore, solvent-free, room temperature polymerization of the recovered MVL can be used to synthesize PMVL.

Recycling Polyurethane

Current non-degradable, petroleum-derived polyurethane products create a massive waste management problem. Biobased and chemically recyclable polyurethanes, together with the unique MVL recycling strategy, bypasses many of the technical challenges that plague chemical recycling of polyurethanes.

BENEFITS AND FEATURES:

- Biobased and chemically recyclable
- Similar mechanical properties and performance of petroleum-derived PU
- Recycle PMVL foams to recover MVL monomer

APPLICATIONS:

Technology ID

20160238

Category

Engineering & Physical Sciences/Chemicals Engineering & Physical Sciences/Materials Engineering & Physical Sciences/Sustainable Technology

Learn more



- Biobased and chemically recyclable polyurethane synthesis
- PMVL synthesis
- MVL recovery
- PMVL recycling

Phase of Development - Proof of concept

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Publications

<u>Chemically Recyclable Biobased Polyurethanes</u> ACS Macro Letters, DOI: 10.1021/acsmacrolett.6b00193