



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

Technology No. 20160238

**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  $\beta$ -methyl- $\delta$ -valerolactone (MVL), to create a bio-based PMVL (poly  $\beta$ -methyl- $\delta$ -valerolactone) polyol with similar mechanical properties and performance of petroleum-derived PU.

### MN-IP Try and Buy

#### Try

- \$5000 for a six month trial
- Trial fee is waived for MN companies or if sponsoring \$50,000+ research with the University
- No US patent costs during trial

#### Buy

- \$30,000 conversion fee (TRY to BUY)
- Royalty rate of 3% (2% for MN company)
- Royalty free for first \$1M in sales

## 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:

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

**Phase of Development** - Proof of concept

### Researchers

Marc Hillmyer, PhD

*Professor, Department of Chemistry, College of Science and Engineering*

[External Link](http://chem.umn.edu) (chem.umn.edu)

Frank Bates, ScD

*Regents Professor, Chemical Engineering & Materials Science, College of Science and Engineering*

[External Link](http://www.cems.umn.edu) (www.cems.umn.edu)

Christopher Macosko, PhD

*Professor, Chemical Engineering & Materials Science, College of Science and Engineering*

[External Link](http://www.cems.umn.edu) (www.cems.umn.edu)

### Publications

[\*Chemically Recyclable Biobased Polyurethanes\*](#)

*ACS Macro Letters*, DOI: 10.1021/acsmacrolett.6b00193

<https://license.umn.edu/product/monomer-recovery-from-biobased-polyurethane>