Lignin-Derivable Diacrylate Networks: Exploring the Connection Between Network Architecture and Mechanics (NSF GCR CMMI 1934887)

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Goals
1. Develop structure-property relationships of lignin-derivable diacrylate networks
2. Investigate the effect of network architecture on material mechanics to guide the design of lignin-derivable high-performance (meth)acrylate materials

Overview

Important Achievements

Variation of Chemical Structure and Network Architecture

Tailored network architecture and thermomechanical properties
- Increased inhomogeneity (broader tan δ peak and lower conversion) with higher diacrylate content
- Enhanced storage modulus with higher diacrylate content

ATR-FTIR

DMA

Future Work/ Collaborative Opportunities

Sustainable & Advanced functional materials

(Semi-)Interpenetrating networks
Shape memory materials

- Various chemistry (amine/imine, epoxy, etc.)
- Diverse functions (Energy dissipation, reprocessability, etc.)

References


Acknowledgements

- NSF GCR CMMI 1934887
- University of Delaware
- Korley Research Group
  https://sites.udel.edu/korleygroup/
- Center of Plastics Innovation (CPI)