





The **TOWER**
Undergraduate
Research Journal

MeMBL: Ring-opening a pathway to a renewable, chemically customizable plastic.

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α -Methylene- γ -methyl- γ -butyrolactone (MeMBL) is a biomass-derived compound known to be polymerizable to make an acrylic material with a high glass transition temperature. Also of interest is the presence of a lactone ring in the structure of MeMBL, which can be opened to create a pathway to modification of a MeMBL polymer. This would expand the range of uses for poly(MeMBL) as a plastic. A polymer composed of pure MeMBL and a polymer composed of MeMBL and styrene (the main component of Styrofoam) were prepared, and subjected to reactions with sodium hydroxide in alcohols, water, or dimethyl sulfoxide (DMSO). Evidence of ring-opening was determined either by observation of a change in the polymer's solubility or by NMR analysis. Both the pure MeMBL polymer and MeMBL/styrene copolymer showed evidence of ring-opening when exposed to sodium hydroxide in water, while no reaction was observed with the same treatment in alcohols. The poly(MeMBL) ring was observed to close over time. Ring-opening was found to be effective for a pathway to further work on the open ring.

production of an acrylic polymer that is similar in structure to non-renewable polymer methyl methacrylate (MMA), with a glass transition temperature (Manzer, 2004). Structure of the mentioned monomers and the ring re



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News

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The inaugural issue is here! Take a look.

We are reopening applications for non-editorial board staff [positions](#). Interested? Submit an [application](#)!

We will be holding an informational session for *The Tower* in the near future. Please check back later for details.

Thank you to all of the submitters, faculty and student reviewers, and production staff. We couldn't have done it without you! **Congratulations** to the new editorial board! We have confidence that each of these students will assist us in producing the highest quality issue possible, and are honored to have them as part of our team.

Thank you to all of the students who submitted manuscripts for review. Authors will be notified of the final decisions of the editorial board on or before April 15th. Good Luck!

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