



Polymeric reactive additives for repurposing mixed plastic waste

IP Status: Provisional Patent Application Filed

Applications

- Polymer compatibilizer
- Upcycling incompatible PET/POs blends

Technology Overview

Polyethylene terephthalate (PET) and common polyolefins (POs), specifically polyethylene (PE) and polypropylene (PP), represent approximately 80% of plastic waste in the US. However, recycling rates for these materials are low due to challenges in separating mixed waste streams into pure recycle material streams and the inability to mix different polymer materials together to provide a functional plastic. Researchers at the University of Minnesota have developed hydroxy-terminated POs as reactive additives for compatibilizing commercial PET/PO binary blends. Weight percentages as low as 0.5% of these reactive additives yield functional plastic blends with increased fracture strength and toughness compared to blends without the additive. Additionally, these reactive additives do not require specialized manufacturing processes nor do they release volatile components. They have been shown to enhance melt-mixes of PET/POs blends using common plastic melt-mixing technologies such as extrusion.

Phase of Development

TRL: 4-5

Polymeric reactive additives have been demonstrated to compatibilize PET/PE blends and are currently being optimized for PET/PP blends.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

- [Christopher J. Ellison, PhD](#) Professor, Department of Chemical Engineering and Materials Science
- [Marc A. Hillmyer, PhD](#) McKnight Presidential Endowed Chair, Department of Chemistry

References

1. Zervoudakis, A. J.; Sample, C. S.; Peng, X.; Lake, D.; Hillmyer, M. A.; Ellison, C. J.(2022) , <https://doi.org/10.1021/ACSMACROLETT.2C00601>, <https://pubs.acs.org/doi/10.1021/acsmacrolett.2c00601>, 18, 1396–1402

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