

## Synthesis of Functional Polyolefins from Polybutadiene as a Compatibilizer for Polyolefin blends

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Although polymers have been very useful since their discovery, most synthetic polymers are non-biodegradable, creating waste management and recycling issues.<sup>[1]</sup> Polyolefin waste is particularly problematic because its components, mainly polyethylene (PE) and polypropylene (PP), are difficult to separate and the recycled blends have mediocre mechanical properties.<sup>[2]</sup> A promising solution is to compatibilize these blends with vitrimers, which are polymer networks that feature crosslinks based on dynamic covalent bonds. These vitrimers may offer interesting thermomechanical properties when used as additives for commercial polyolefins.<sup>[3]</sup> We aim to explore the consequences of heterogeneous grafting for such additives. For this research, two approaches will be used to design and prepare polyolefin vitrimers from hydrogenated polybutadiene: 1) grafting using thiol-ene chemistry, and 2) grafting by reactive extrusion with maleimide dioxaborolane. The resulting materials will be used to study the structure-property relationship of various polyolefin vitrimers, with particular emphasis on the rheological and thermomechanical properties of the materials. We hope that the results of these investigations will provide new perspectives on different processes for synthesis of polyolefin compatibilizers

### References:

- [1] Plastic waste and recycling in the EU: facts and figures. Topics | European Parliament. <https://www.europarl.europa.eu/topics/en/article/20181212STO21610/plastic-waste-and-recycling-in-the-eu-facts-and-figures> (accessed 2024-09-27)
- [2] Plastics - the Facts 2022 • Plastics Europe. <https://plasticseurope.org/knowledge-hub/plastics-the-facts-2022/> (accessed 2024-09-27).
- [3] Wang, Z.; Gu, Y.; Ma, M.; Liu, Y.; Chen, M. *Macromolecules* 2021, 54 (4), 1760–1766.