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“New approaches for intrinsic self-healing polyurethanes and related composites under mild conditions”

Polyurethanes (PU) are ranked 6th as the most produced polymer worldwide and represent high potential in various applications. During use, PU-based materials are subjected to photo, thermal and mechanical aggressions, which limit their performance, lifetime and reliability. To address this problem, the concept of self-healing is of great interest to design high performance self-healing polyurethanes (SH-PUs). Based on the economic interests that represent the polyurethane market, developing SH-PUs with intrinsic ability to self-heal shall represent a driving factor for more reliable, safe, durable, sustainable, reprocessable and ecological polyurethanes. In this regard, we will herein propose polyurethane approaches developed at UMons that are able to self-heal under mild conditions. These self-healing PU as discussed were constructed around thermoreversible Diels-Alder chemistry, spontaneous formation of supramolecularly-driven water-urea clusters and combining hydroxyurethanes and iminoboronate/boroxine chemistries.

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