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Recent Advances in Self-Healing Polymers

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Message from the Guest Editors

While self-healing is a ubiquitous feature in nature, it is challenging to engineer into synthetic materials. In polymer science, several strategies are used to achieve self-healing: reversible covalent bonds, dynamic physical bonds, incorporation of unreacted monomer/catalyst/solvent combinations in microcapsules and channels. There has already been lots of work on incorporating self-healing strategies in thermoplastics, thermosets and elastomers. The basic challenge remains to ensure sufficient mobility and dynamic behavior in the material while retaining mechanical robustness for the intended application.

Topics could involve (but are not limited to) synthesis, property, routes for scale-up and applications of self-healing polymers. Other topics to consider could be use of bio-based monomers/polymers, strategies to overcome manufacturing/scale-up challenges, contributions of physical and chemical aspects of self-healing polymers, and successful applications of these materials. Research related to the inclusion of self-healing concepts into the circular economy principle is also of interest.

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