The Diels-Alder reaction applied to polymers from renewable resources: thermal reversibility and recyclability

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The Diels-Alder (DA) reaction applied to monomers incorporating furan and maleimide moieties is discussed in terms of the synthesis of different macromolecular structures including linear, branched and crosslinked architectures of homo- and co-polymers. Emphasis is placed, on the one hand, on the interest associated with this strategy regarding the thermal reversibility of these DA materials, which allows their mendability and recyclability to be readily attained, and, on the other hand, on the specific application of these features to monomers or polymers from renewable resources, such as plant oils, starch, cellulose, chitosan, gelatin and natural rubber, quite apart from the ubiquitous presence of the furan heterocycle in all the systems described.