Controlling reactivity under tension

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Mechanical force is a formidable, and relatively unexplored, source of energy that, with its ability to distort, bend and stretch chemical bonds, is unique in the way it activates chemical reactions. The precise control of this force could revolutionise how we build and rearrange molecules and change the way we think about chemical transformations. Pulling both ends of a macromolecule apart creates highly directional strain with its highest intensity in the middle of the chain and, in polymer mechanochemistry, the force is transduced to force-sensitive moieties (mechanophores) embedded within the polymeric backbone. Here we use high-intensity ultrasound to activate mechanophores in solution, and show how geometry, topology, and substitution can be used to control the mechanical activity of a mechanophore.[1-6]

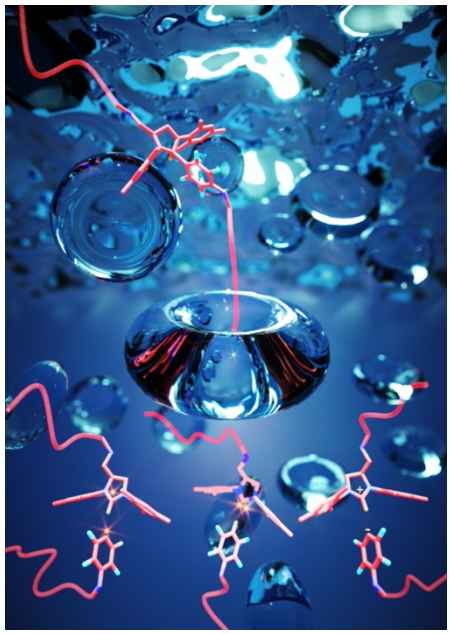

Figure 1. *Cartoon depiction of the cavitation-induced mechanical activation of a mechanophore breaking along 3 concomitant dissociation pathways.*[1-2]

References

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