

Séminaire

Mardi 12 juillet 2022 à 10h30
Amphithéâtre Henri Benoît et visio

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Molecular Insights into the Mechanical Lifetime of Elastomers

Elastomers are ubiquitous in applications that require large reversible deformations. Although toughness remains an important design consideration to prevent catastrophic failure at high loads, lifetime is often controlled by the progressive growth of an inherent flaw over time. This fracture by mechanical fatigue remains poorly understood due to the inability to visualize and quantify damage by network chain scission and understand fracture mechanisms under a range of loads.

In this seminar, I will discuss how tagging model elastomers with probes that fluoresce upon chain elongation until failure enables mapping and quantification of damage elastomers. I will consider fracture under two common loads - (i) cyclic loading over numerous cycles of low load (*i.e.*, cyclic fatigue) and (ii) rapid decompression from supersaturated pressures (*i.e.*, cavitation); and outline design rules for fatigue- and cavitation-resistant elastomers based on fracture mechanisms.

