NAPLES, ITALY 30 JUNE - 4 JULY
ACEX2025 NAPLES
18th International Conference on Advanced Computational Engineering and Experimenting

ABSTRACT

A Computational Framework for Strain-Induced Crystallization based on Thermodynamic Regularization

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Strain-induced crystallization is a type of phase transition in natural rubbers triggered by deformation. The computation of such phenomenon necessitates proper numerical regularization due to the loss of ellipticity at the onset of strain-induced crystallization. This challenge is intensified by the absence of internal dissipation in such phase transition [1, 2], which precludes the use of dissipation potentials commonly employed in computational mechanics literature. In this talk, we extend the recently developed thermodynamic regularization method [3] to the context of strain-induced crystallization in natural rubbers; and formulate a novel computational framework that is based exclusively on the laws of thermodynamics and a single thermodynamic potential.

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