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ABSTRACT:

Symmetric indentation testing and FE-based parameter identification for polymers

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We propose a methodology using indentation testing and finite element based parameter identification to calibrate nonlinear inelastic constitutive models for polymer materials. The usually applied Berkovich or Vickers tips are thereby substituted by conical or ball indenters to account for indentation depths in the micron range and to enable application of fast symmetric FE-models for model calibration. Different to analytical evaluation methods like Oliver-Pharr and the like, we therewith can measure the large strain viscoelastoplasticity and calibrate corresponding material models for polymers, from stiff thermoplastics to compliant and even sticky elastomer foams.