

# Identification of the elasto-viscoplastic parameters for a thermoplastic polymer by instrumented indentation

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**Abstract:** The indentation test is a simple, fast and reliable tool that allows the determination of the materials mechanical properties from experimental load-penetration curves using the inverse computation methods. Through this approach and using the Berkovich indenter, the creep and elasto-plastic properties of the polymers were estimated. Simulations of the elasto-viscoplastic behaviour of the studied polymers under nanoindentation tests were performed. A finite element analysis was carried out to simulate the mechanical behaviour of polymers which can be defined by the Young's modulus  $E$  and the parameters ( $K$  and  $n$ ) that describe the materials hardening for large deformations. The obtained functions from the numerical simulations were validated by nanoindentation and compression tests for the studied polymers.

**Keywords :** Nano-indentation, polymers, inverse computation methods