

1. Record Nr.	UNISA996214710603316
Titolo	Particle and continuum aspects of mesomechanics [[electronic resource] /] / edited by George C. Sih, Moussa Nait-Abdelaziz, Toan Vu-Khanh
Pubbl/distr/stampa	London ; ; Newport Beach, CA, : ISTE, c2007
ISBN	1-280-84760-3 9786610847600 0-470-61079-4 0-470-39344-0 1-84704-675-4
Descrizione fisica	1 online resource (837 p.)
Collana	ISTE ; ; v.2
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Disciplina	620.1/1292 620.11292
Soggetti	Fracture mechanics Continuum mechanics Microstructure Micromechanics - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Particle and Continuum Aspects of Mesomechanics; Table of contents; Section I: Physical Mechanisms of Multiple Damage; Multiple hierarchical scale-dependency on physical mechanisms of material damage: macromechanical, microstructural and nanochemical; Surface layers and inner interfaces as functional subsystems of solid; Microstructural evolution in dual-phase steels at high strain-rates; Plastic deformation in single crystal Ni3Fe (thin and thick plates); Mechanisms of physical aging in polypropylene; Section II: Physical, Mesoscopic and Multiscale Models Finite element homogenization for the determination of the RVE size for elastoviscoplastic Polycrystalline Materials An incremental energy based fatigue life calculations method for metallic structures under

multiaxial amplitude loadings; Meso/micro fatigue crack growth involving crystal structure and crack geometry; Development of a nonlinear homogenization method: evaluation and application to a rubber-reinforced material; Cavitation of rubber toughened polymer: numerical and experimental investigation; Ductile damage by interface decohesion

A multiscale discussion of fatigue and shakedown for notched structures Two scale approach for the defect tolerance fatigue design of automotive components; Section III: Film, Layer and Interface; Plastic deformation and fracture of thin metallic films on annealing in terms of the multilevel model of a deformed solid; Mesoscopic model for electroactive Composite Films and its applications; Interfaces of one-way glass/epoxy composite in inflexion; Point defects of the elastic properties of layered structured nano-materials; DFT study of interactions of water on Kaolinite and Goethite surfaces

Nanolayered MAX phases from ab initio calculations Section IV: Crack Models and Solutions; Fracture initiation at re-entrant corners: experiments and finite fracture mechanics predictions; Buckling analysis of cracked columns subjected to lateral loads; Micro-cavity effect on the plastic zone size ahead of the crack tip in confined plasticity; Effect of microcrack on plastic zone size ahead of main crack in small-scale plasticity; Stress intensity factor of surface and interface cracks in coating/substrate system; T-stress by stress difference method (SDM)

Elasto-inelastic self-consistent model of ellipsoidal inclusion Crack propagation in solid oxide fuel cells; Elastoplastic solution for an eccentric crack loaded by two pairs of point tensile forces; J-integral and CMOD for cracked cylinders; Oscillating contact of isotropic elastic half-spaces; Section V: Nanomaterials; Mechanical properties of thin pulsed laser deposited amorphous carbons and amorphous carbon/silver nanocomposites; Extension of the Hertz model for accounting to surface tension in nano-indentation tests of soft materials

Multi-scale modeling of tensile behavior of carbon nanotube-reinforced composites

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## Sommario/riassunto

This title brings together a variety of papers presented at the 9th annual Meso meeting in 2007. The topics selected for Meso 2007 are designed to illustrate the relation of thresholds to multiscaling: Flow through capillary tubes in contrast to pipes Laminar and turbulent flow transition Heat convection of thin wires in contrast to cylinders Electrical conductance of macro- and nano-circuits Rubbery and glassy polymers Single- and poly-crystal behavior Strength of wires and round cylindrical bars Uni-axial and multi-axial material: linear and non-linear response

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