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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 cryctal Ni3Fe (thin and thick plates); Mechanisms of physical aging in polypropylene; Section II: Physica1, Mesoscopical and Multiscale Models Finite element homogeneization for the determination of the RVE size for elastoviscoplastic Polycrystalline MaterialsAn 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 homogeneization 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 structuresTwo 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 glasslepoxy composite in inflexion; Point defects of the elastic properties of layered structured nano-materials; DFT study of interactions of water on Kaolinte and Goethite surfaces
Nanolayered MAX phases from ab initio calculationsSection 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 inclusionCrack 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

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 pipesLaminar and turbulent flow transitionHeat convection of thin wires in contrast to cylindersElectrical conductance of macro- and nano-circuitsRubbery and glassy polymersSingle- and poly-crystal behaviorStrength of wires and round cylindrical barsUni-axial and multi-axial material: linear and non-linear response<li