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Kikvidze, O. G.

Irreversible deformation under thermomechanical loading of solids. (English) Zbl 07441494

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Summary: The article considers irreversible deformation of solid under thermomechanical loading, using the phenomenological approach. It is assumed that the strains are small. On the basis of the dilatometric curves and the stress-strain curves, the condition was formulated for the stability of material, and the major inequality and constitutive equations for the irreversible strains under thermo-mechanical loading were obtained. These equations describe the pattern of inelastic deformation of a wide class of metallic materials in the temperature ranges of the phase transformations.

MSC:

74F05 Thermal effects in solid mechanics
74C99 Plastic materials, materials of stress-rate and internal-variable type
74A20 Theory of constitutive functions in solid mechanics

Keywords:

irreversible strain; stable deformation condition; inelastic constitutive equation; dilatometric curve

Full Text: Link

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