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4.6 Formation of Jogs. Low-Angle Sub-boundaries in f.c.c. and b.c.c. Crystal Lattices4.7 Significance of the Stacking Faults Energy; 4.8 Stability of Dislocation Sub-boundaries; 4.9 Scope of Application of the Theory; 4.10 Summary; 5 Simulation of the Evolution of Parameters during Deformation; 5.1 Parameters of the Physical Model; 5.2 Equations; 5.2.1 Strain Rate; 5.2.2 Change in the Dislocation Density; 5.2.3 The Dislocation Slip Velocity; 5.2.4 The Dislocation Climb Velocity; 5.2.5 The Dislocation Spacing in Sub-boundaries; 5.2.6 Variation of the Subgrain Size
5.2.7 System of Differential Equations5.3 Results of Simulation: Changes in the Structural Parameters; 5.4 Density of Dislocations during Stationary Creep; 5.5 Summary; 6 High-temperature Deformation of Superalloys; 6.1 Phase in Superalloys; 6.2 Changes in the Matrix of Alloys during Strain; 6.3 Interaction of Dislocations and Particles of the Hardening Phase; 6.4 Dependence of Creep Rate on Stress. The Average Length of the Activated Dislocation Segments; 6.5 Mechanism of Strain and the Creep Rate Equation; 6.6 Composition of the Phase and Mean-square Amplitudes of Atomic Vibrations
6.7 Influence of the Particle Size and Concentration6.8 The Prediction of Properties on the Basis of Integrated Databases; 6.9 Summary; 7 Single Crystals of Superalloys; 7.1 Effect of Orientation on Properties; 7.2 Deformation of Single-crystal Superalloys at Lower Temperatures and Higher Stress; 7.3 Deformation of Single-crystal Superalloys at Higher Temperatures and Lower Stress; 7.4 On the Composition of Superalloys; 7.5 Rafting; 7.6 Effect of Composition and Temperature on / Misfit; 7.7 Other Creep Equations; 7.8 Summary; 8 High-temperature Deformation of Some Refractory Metals
8.1 The Creep Behavior

Sommario/riassunto

Creep and fatigue are the most prevalent causes of rupture in superalloys, which are important materials for industrial usage, e.g. in engines and turbine blades in aerospace or in energy producing industries. As temperature increases, atom mobility becomes appreciable, affecting a number of metal and alloy properties. It is thus vital to find new characterization methods that allow an understanding of the fundamental physics of creep in these materials as well as in pure metals.Here, the author shows how new in situ X-ray investigations and transmission electron microscope studies lead to