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2.3.4. Experimental observations of interaction mechanisms2.3.5. Elastic stress fields associated with extrinsic dislocations; 2.4. Relaxation of stress fields associated with extrinsic dislocations; 2.4.1. Relaxation processes in a grain boundary; 2.4.2. Evolution of stress fields with relaxation time; 2.4.3. Experimental studies of grain boundary relaxation phenomena; 2.4.4. Conclusion; 2.5. Relationships between elementary interface mechanisms and mechanical behaviors of materials; 2.6. Bibliography; Chapter 3. Grain Boundaries in Cold Deformation; 3.1. Introduction
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3.4.3. Identification of the constitutive and hardening law parameters3.4.4. Examples of local mechanical fields proposed by the polycrystalline models; 3.5. Hall-Petch's law, geometrically necessary dislocations; 3.5.1. Definition; 3.5.2. Modeling the grain size effect in polycrystals, comparison with experiments; 3.6. Sub-grain boundaries and grain boundaries in deformation and recrystallization; 3.6.1. Deformation sub-boundaries and grain boundaries; 3.6.2. Recrystallization sub-grain boundaries; 3.7. Conclusion; 3.8. Bibliography
Chapter 4. Creep and High Temperature Plasticity: Grain Boundary Dynamics

Sommario/riassunto

This book explores the fundamental role of grain boundaries in the plasticity of crystalline materials, providing a multi-scale approach to plasticity to facilitate understanding. It starts with the atomic description of a grain boundary, moves on to the elemental interaction processes between dislocations and grain boundaries, and finally shows how the microscopic phenomena influence the macroscopic behaviors and constitutive laws. Drawing on topics from physical, chemical, and mechanical disciplines, this work also explains properties of deformation at low and high temperature, creep, fatigu