

1. Record Nr.	UNINA9910438111803321
Autore	Priester Louissette
Titolo	Grain Boundaries [[electronic resource]] : From Theory to Engineering / / by Louissette Priester
Pubbl/distr/stampa	Dordrecht : , : Springer Netherlands : , : Imprint : Springer, , 2013
ISBN	1-283-91146-9 94-007-4969-4
Edizione	[1st ed. 2013.]
Descrizione fisica	1 online resource (457 p.)
Collana	Springer Series in Materials Science, , 0933-033X ; ; 172
Disciplina	541 620.11299 669/.95
Soggetti	Materials—Surfaces Thin films Crystallography Physical chemistry Nanotechnology Metals Surfaces and Interfaces, Thin Films Crystallography and Scattering Methods Physical Chemistry Nanotechnology and Microengineering Metallic Materials
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	From the Contents: Part 1: From intergranular order to disorder -- Introduction: brief history of the intergranular order concept -- Geometrical order -- Mechanical stress order -- Atomic order -- Order or disorder at high temperature -- Grain boundary order and energy -- Grain boundary order or disorder: what conclusion? -- Part 2: From the ideal grain boundary to the real grain boundary -- Defects in the grain boundary structure -- Intergranular segregation -- Precipitation at grain boundaries -- Interactions between dislocations and grain boundaries -- Relaxation of the intergranular stresses -- Part 3: From

the free grain boundary to the constrained grain boundary -- The triple junction -- Grain boundary network - grain boundary texture.

Sommario/riassunto

Grain boundaries are a main feature of crystalline materials. They play a key role in determining the properties of materials, especially when grain size decreases and even more so with the current improvements of processing tools and methods that allow us to control various elements in a polycrystal. This book presents the theoretical basis of the study of grain boundaries and aims to open up new lines of research in this area. The treatment is light on mathematical approaches while emphasizing practical examples; the issues they raise are discussed with reference to theories. The general approach of the book has two main goals: to lead the reader from the concept of 'ideal' to 'real' grain boundaries; to depart from established knowledge and address the opportunities emerging through "grain boundary engineering", the control of morphological and crystallographic features that affect material properties. The book is divided in three parts: I 'From intergranular order to disorder' deals with the concept of the perfect grain boundary, at equilibrium, and questions the maintenance of its crystalline state. II 'From the ideal to the real grain boundary' deals with the concept of the faulted grain boundary. It attempts to reveal the influence of the grain boundary structure on its defects, their formation and their accommodation. III 'From free to constrained grain boundaries' is devoted to grain boundary ensembles starting from the triple junction (the elemental configuration) to real grain boundary networks in polycrystals. This part covers a new and topical development in the field. It presents for the first time an avenue for researchers working on macroscopic aspects, to approach the scale of description of grain boundaries. Audience: graduate students, researchers and engineers in Materials Science and all those scientists pursuing grain boundary engineering in order to improve materials performance.
