



# **Grain Boundary Migration in Metals: Thermodynamics, Kinetics, Applications, Second Edition (Materials Science & Technology)**

*Gunter Gottstein, Lasar S. Shvindlerman*

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A major goal of materials science is to create new engineering materials and optimize their cost and performance. Understanding how adjacent materials behave at their borders is an essential part of this process. Grain boundaries are the longest-known crystal defects, but although they were discovered in the mid-eighteenth century, until quite recently, we did not understand them very well. Even now, scientists are still searching for the best ways to comprehensively characterize a material's microstructure—and accurately predict its evolution and behavior.

**Fills the gap between the physics of grain boundary motion and its engineering practicality**

Like the popular first edition, **Grain Boundary Migration in Metals: Thermodynamics, Kinetics, Applications, Second Edition** focuses extensively on the thermodynamics, kinetics, and applications involved with individual grain boundary migration in metals. However, this new volume adds a decade's worth of new developments in research and methods. It offers an up-to-date overview of current knowledge of the grain boundary migration process, and it details how migration influences microstructural evolution, including the recrystallization process and the creation of new materials. The authors rely on well-defined geometry and crystallography to address key topics such as grain growth, textures, and the properties and behavior of grain boundaries, particularly the nonlinear interaction of boundary elements.

**This invaluable second edition:**

- Covers the latest techniques and computer simulations used in the study of single-grain boundary motion and grain boundary systems with junctions

- Provides the latest experimental data of grain boundary free volume measurements and offers the first measurements of grain boundary junction line tension
- Includes new problems with solutions

As a solid foundation on which you can build your understanding of the migration phenomenon, this book should be required reading for researchers in areas such as interface physics and materials science of microstructure evolution and property control. It will also be vastly useful to any professional engaged in metals production and/or the heat treatment of metals and alloys.

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