DESCRIPTION

A thorough exploration of the atomic structures and properties of the essential engineering interfaces—an invaluable resource for students, teachers, and professionals.

The most up-to-date, accessible guide to solid-vapor, solid-liquid, and solid-solid phase transformations, this innovative book contains the only unified treatment of these three central engineering interfaces. Employing a simple nearest-neighbor broken-bond model, Interfaces in Materials focuses on metal alloys in a straightforward approach that can be easily extended to all types of interfaces and materials. Enhanced with nearly 300 illustrations, along with extensive references and suggestions for further reading, this book provides:

* A simple, cohesive approach to understanding the atomic structure and properties of interfaces formed between solid, liquid, and vapor phases

* Self-contained discussions of each interface—allowing separate study of each phase transformation

* A comparative look at the different interfaces, including atomic structure and crystallography; anisotropy, roughening, and melting; interfacial stability and segregation; continuous and edge growth models; and atomistic modeling

* An analysis of nearest-neighbor broken-bond results against thermodynamic and kinetic descriptions of the interfaces

* Problem sets at the end of each chapter, emphasizing the key concepts detailed in the text
Spanning the fields of chemical, electrical and computer engineering, materials science, solid-state physics, and microscopy, Interfaces in Materials bridges a major gap in the literature of surface and interface science.

ABOUT THE AUTHOR

JAMES M. HOWE, PhD, is Associate Professor of Materials Science and Engineering at the University of Virginia. He is the recipient of numerous honors and awards for his research on transformation interfaces and electron microscopy, and his articles have appeared in such journals as Philosophical Magazine A, Acta Metallurgica et Materialia, and Ultramicroscopy.

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