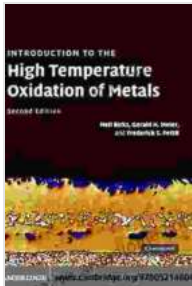


Introduction to the High Temperature Oxidation of Metals



Introduction to the High Temperature Oxidation of Metals by Prof. Sham Tickoo Purdue Univ.

★★★★☆ 4.1 out of 5

Language : English
File size : 18467 KB
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Screen Reader : Supported
Enhanced typesetting : Enabled
Print length : 354 pages

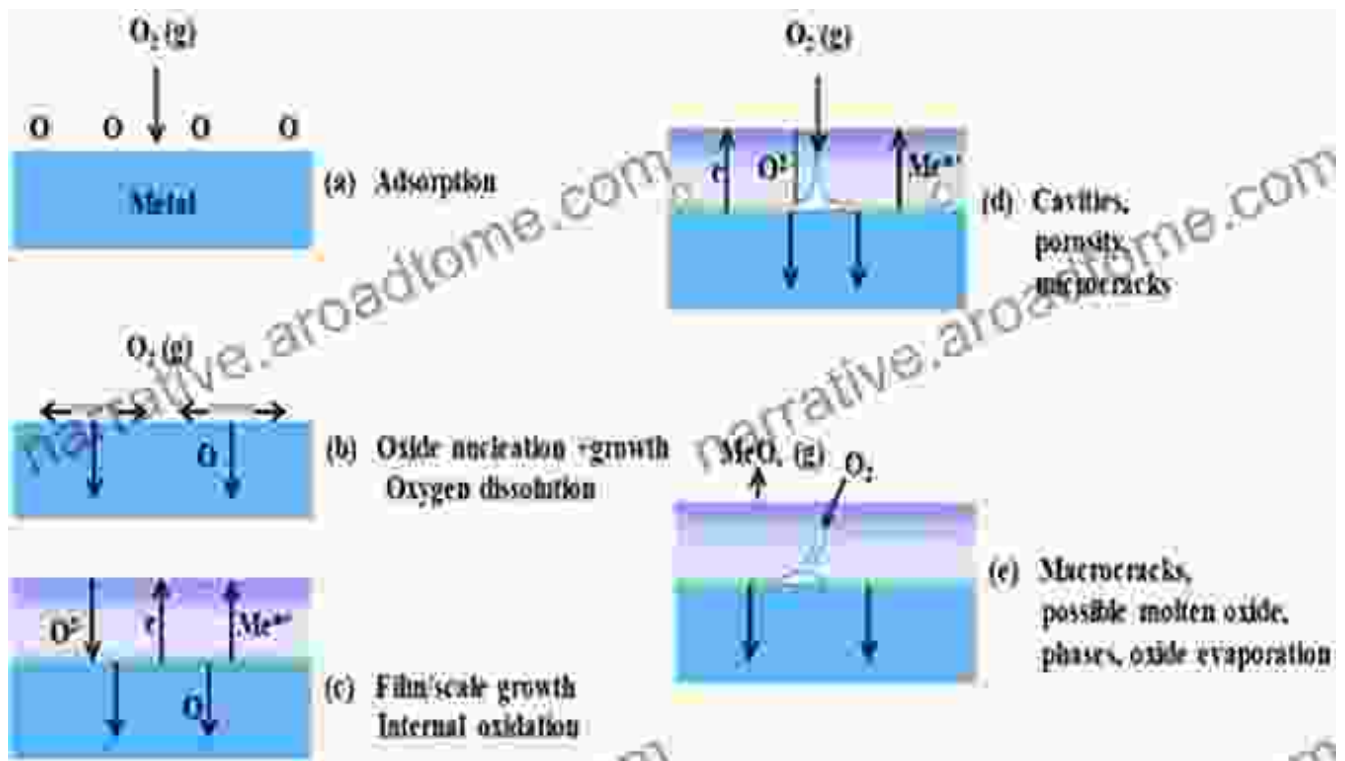


Unveiling the Secrets of Metallic Oxidation in Extreme Environments

Welcome to the captivating world of high temperature oxidation of metals, a phenomenon that governs the behavior of metals at elevated temperatures. In this comprehensive book, you'll embark on an in-depth exploration of the fundamental principles, experimental techniques, and real-world applications of this critical topic.

Chapter 1: The Fundamentals of High Temperature Oxidation

Laying the foundation for your understanding, this chapter introduces the basic concepts of oxidation, thermodynamics, and kinetics. You'll gain insights into the types and characteristics of oxide scales, their formation mechanisms, and the factors influencing oxidation rates.



Chapter 2: Experimental Techniques in High Temperature Oxidation

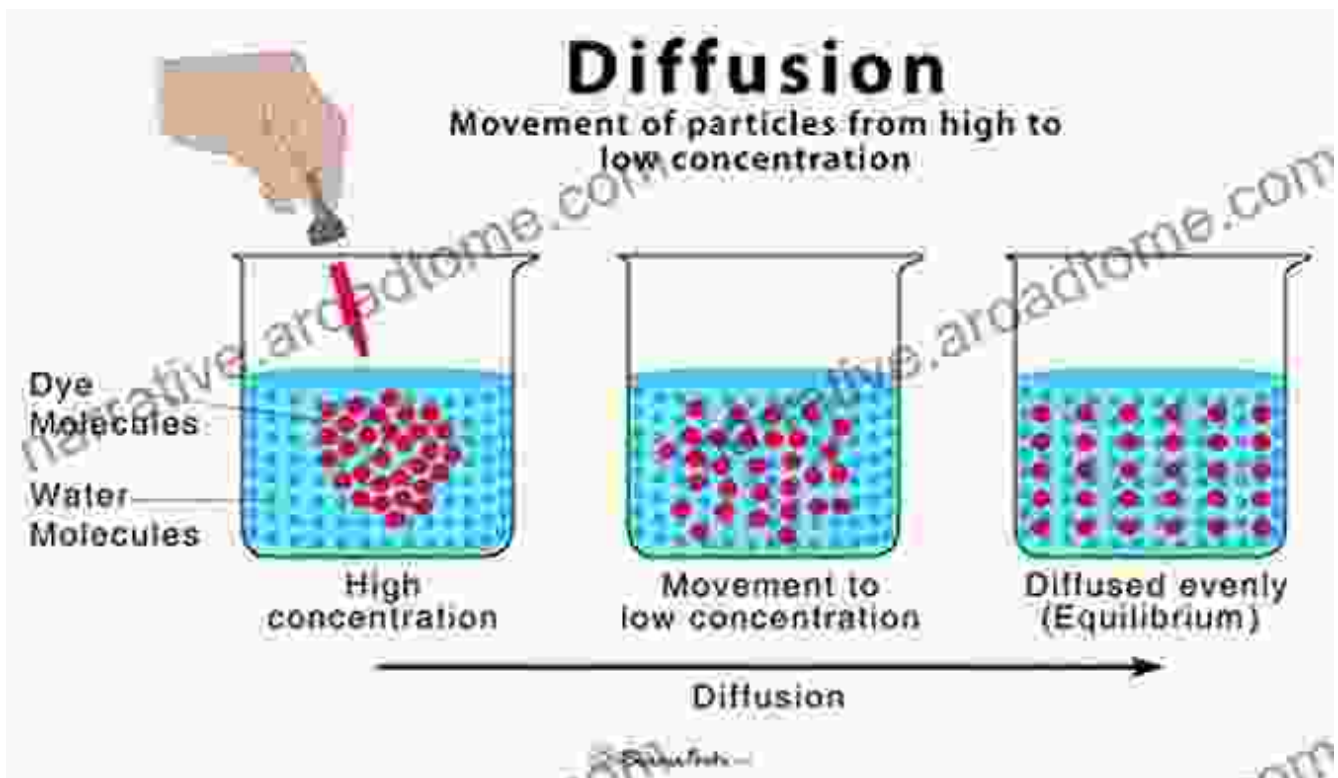
Delve into the experimental methods used to study high temperature oxidation. You'll explore different types of furnaces, sample preparation techniques, measurement techniques, and advanced characterization tools. These techniques provide valuable insights into the microstructure, composition, and properties of oxide scales.



Experimental setup for high temperature oxidation studies

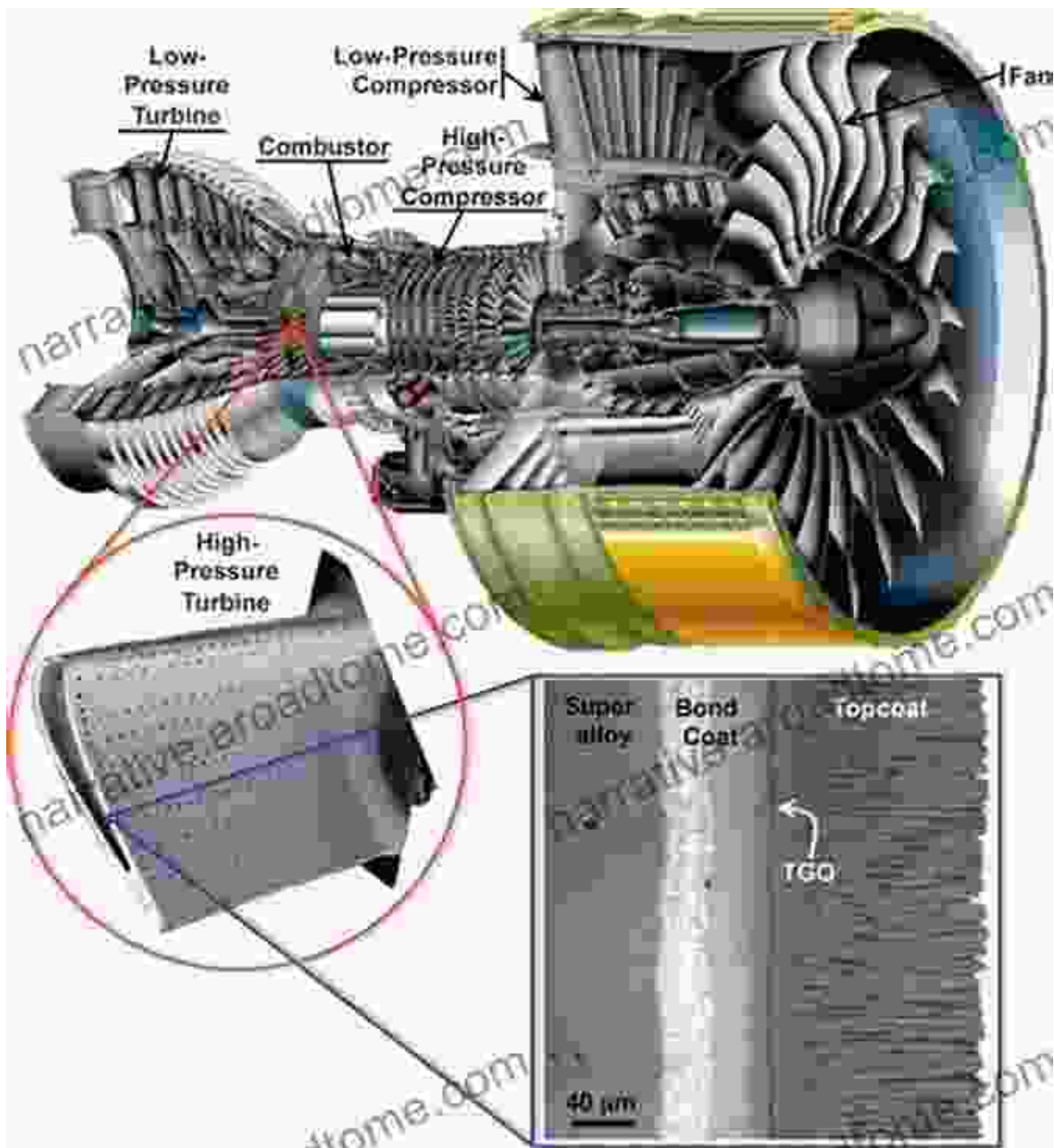
Chapter 3: Oxidation Mechanisms and Models

Uncover the intricate mechanisms behind the oxidation of metals. This chapter discusses various theories and models that explain the formation and growth of oxide scales. You'll explore the role of diffusion, nucleation, and growth processes, as well as the effects of temperature, oxygen partial pressure, and alloying elements.



Chapter 4: Real-World Applications of High Temperature Oxidation

Discover the practical applications of high temperature oxidation knowledge in various industries. You'll learn about the challenges and solutions in aerospace, energy, manufacturing, and other fields. Topics covered include corrosion protection, thermal barrier coatings, and the development of new materials with enhanced oxidation resistance.



Thermal barrier coatings for high temperature oxidation protection in aerospace applications

Chapter 5: Advanced Topics and Future Directions

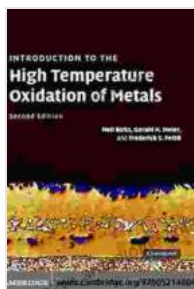
Explore the cutting-edge research and emerging trends in high temperature oxidation. This chapter covers advanced topics such as the influence of

nanostructures, computational modeling, and the development of self-healing coatings. You'll gain insights into the future directions of research and development in this field.

By the end of this book, you'll have a comprehensive understanding of the high temperature oxidation of metals. You'll be equipped with the knowledge and tools to design and develop materials with enhanced oxidation resistance, contributing to advancements in various industries and technologies. Embrace the transformative power of high temperature oxidation and shape the future of materials science.

Free Download your copy today and unlock the secrets of high temperature oxidation!

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