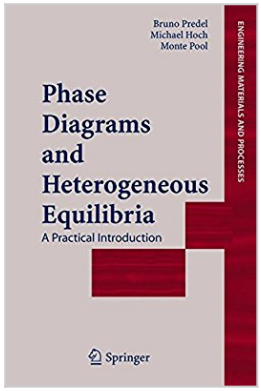

Phase Diagrams and Heterogeneous Equilibria: A Practical Introduction (Engineering Materials and Processes)

By Bruno Predel, Michael Hoch, Monte J. Pool

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This advanced comprehensive textbook introduces the practical application of phase diagrams to the thermodynamics of materials consisting of several phases. It describes the fundamental physics and thermodynamics as well as experimental methods, treating all material classes: metals, glasses, ceramics, polymers, organic materials, aqueous solutions. With many application examples and realistic cases from chemistry and materials science, it is intended for students and researchers in chemistry, metallurgy, mineralogy, and materials science as well as in engineering and physics. The authors treat the nucleation of phase transitions, the production and stability of technologically important metastable phases, and metallic glasses. Also concisely presented are the thermodynamics and composition of polymer systems. This innovative text puts this powerful analytical approach into a readily understandable and practical context, perhaps for the first time.

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Editorial Review

Review

From the reviews :

"This graduate textbook introduces the practical application of phase diagrams for students and researchers in materials science, chemistry, and mineralogy, as well as engineering and physics. Heterogeneous equilibria are illustrated by practical examples in different application fields, while theory is kept to a minimum. An emphasis is placed on providing tools for predicting energetic, structural, and physical quantities." (Materials Today)

"Predel and colleagues offer a good resource for students and professionals who wish to learn more about the practical aspects of phase equilibria … . Unlike most other books on the subject, this practical introduction provides detailed, yet remarkably clear, description of physical phenomena … . The descriptions are enhanced with more than 250 phase diagrams, micrographs, and other illustrations involving both real and idealized systems. … Summing Up: Recommended. Upper-division undergraduates through professionals in materials-related fields." (D.D. Edwards, CHOICE, Vol. 42 (10), June, 2005)

From the Back Cover

This graduate-level textbook provides an introduction to the practical application of phase diagrams. It is intended for students and researchers in chemistry, metallurgy, mineralogy, and materials science as well as in engineering and physics. Heterogeneous equilibria are described by a minimum of theory illustrated by practical examples and realistic case discussions from the different fields of application. The treatment of the physical and energetic background of phase equilibria leads to the discussion of the thermodynamics of mixtures and the correlation between energetics and composition. Thus, tools for the prediction of energetic, structural, and physical quantities are provided. The authors treat the nucleation of phase transitions, the production and stability of technologically important metastable phases, and metallic glasses. Furthermore, the text also concisely presents the thermodynamics and composition of polymer systems.

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