



# Physical Metallurgy and Advanced Materials, Seventh Edition

*R. E. Smallman PhD, A.H.W. Ngan PhD*

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# Physical Metallurgy and Advanced Materials, Seventh Edition

R. E. Smallman PhD, A.H.W. Ngan PhD

**Physical Metallurgy and Advanced Materials, Seventh Edition** R. E. Smallman PhD, A.H.W. Ngan PhD  
Physical Metallurgy and Advanced Materials, Seventh Edition, discusses the fundamental principles of metallurgy and materials science. The present volume emerged from earlier editions of Modern Physical Metallurgy (1962, 1970, 1985) and later editions of Modern Physical Metallurgy and Materials Engineering (1995, 1999). Presentations and content have been updated, and each chapter ends with a set of questions to enable readers to apply the scientific concepts presented in the chapter, as well as emphasize important material properties. Topics covered include atoms and atomic arrangements, phase equilibria and structure, crystal defects, characterization and analysis of materials, and physical and mechanical properties of materials. The chapters also examine the properties of materials, such as advanced alloys, ceramics, glass, polymers, plastics, composites, biomaterials, sports materials, and nanomaterials. **Key Features:**

**\* Renowned coverage of metals and alloys, plus other materials classes including ceramics and polymers.**

**\*Updated coverage of sports materials, biomaterials and nanomaterials.**

**\*Covers new materials characterization techniques, including scanning tunneling microscopy (STM), atomic force microscopy (AFM), and nanoindentation.**

**\*Easy to navigate with contents split into logical groupings: fundamentals, metals and alloys, nonmetals, processing and applications.**

**\*Detailed worked examples with real-world applications.**

**\*Rich pedagogy includes extensive homework exercises, lecture slides and full online solutions manual (coming).**

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