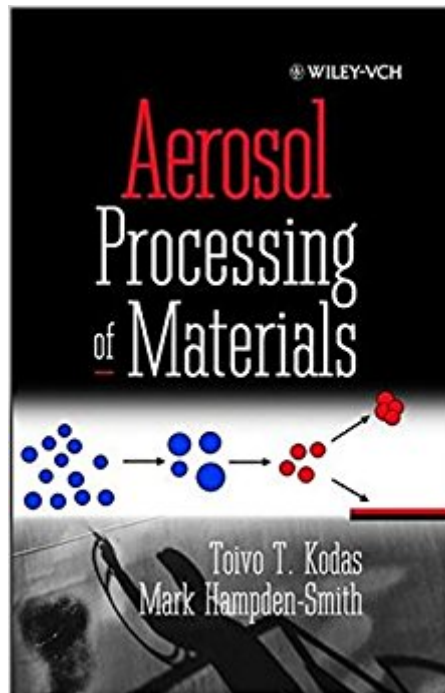




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Aerosol Processing Of Materials



Synopsis

Unifying a wide range of materials synthesis techniques, 'Aerosol Processing of Materials' provides a detailed overview of the production of materials by the use of gas phase processes. Aerosol processes are responsible for the production of many of today's most advanced materials, especially in the semiconductor, optical waveguide, and thin film industries. Many of the unique properties of nanophase materials and composites are only possible through the application of aerosol in materials processing. This book describes various types of aerosol processes and the role of aerosols in materials processing. The work presents the advantages and disadvantages of each process in terms of cost, complexity, purity, and materials properties; and compares these factors to alternative methods of powder and film formation. The title provides the theory needed to understand and advance the fundamentals of this rapidly expanding material manufacturing processes. Written by well-respected leaders in the field, the book illuminates the roles of particle size characterization and size distributions; heat, mass, and momentum transfer; particle transport; condensation and evaporation; and coagulation and coalescence. 'Aerosol Processing of Materials' provides the most up-to-date and comprehensive single source of information available on gas-to-particle powder formation; liquid/solid-to-solid powder formation; film formation; reactor design; and particle/film characterization.

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An authoritative guide to the science, engineering, and technology of aerosol processing. Aerosol

Processing of Materials offers a comprehensive look at advanced materials processing by aerosol methods. This self-contained volume examines in-depth what it takes to generate powders and films with specialized characteristics using gas-phase processes. In three main parts, it addresses particle formation by intraparticle reaction, particle formation by gas-to-particle conversion, and film formation. All aspects of these subjects are considered, from the basic principles and chemistry of aerosols to processing methods and the characterization of materials. The text incorporates an impressive array of examples involving materials such as metals, metal oxides, and metal sulfides for application in pigments, ceramics superconductors, electronics, sensors, glass coatings, semiconductors, optical materials, and thick films. Fully referenced, generously illustrated, and lucidly written by two of the foremost authorities on aerosol processing of materials, this landmark work emphasizes cutting-edge technologies, industrial applications, and the need to put existing research to practical use. *Aerosol Processing of Materials*: * Provides a basic and practical understanding of the relationships between reagents and processes used to generate a variety of materials in powder and film form * Reviews the state-of-the-art of gas-phase nanoparticle technology, including synthesis of nanostructured materials and their properties * Gives simple explanations of the aerosol dynamics in various systems for particle and film formation and the advantages and disadvantages of different systems for particle formation * Features master tables listing all aerosol processing examples presented in the book * Provides problem-solving strategies to avoid degradation or defects in materials produced by aerosol methods. *Aerosol Processing of Materials* offers tremendous insight into current practices, research opportunities, and future trends in this evolving field. It is an invaluable resource for chemists and chemical and materials engineers in the fiber optics, electronics, semiconductor, thick film, wear resistance, refractory, automotive, paint and dye, plastics, ceramics, and sensor industries.

TOIVO T. KODAS and MARK HAMPDEN-SMITH are full professors in the Departments of Chemical Engineering and Chemistry, respectively, at the University of New Mexico in Albuquerque. They are also the founders of the companies Nanochem Research, Inc./ Superior MicroPowders, LLC that are currently commercializing several of the processes discussed in the book. Kodas and Hampden-Smith have previously collaborated to author and coedit *Chemistry of Metals CVD*, published by Wiley-VCH in 1994. Professor Hampden-Smith has coedited *Chemistry of Advanced Materials: An Overview*, a 1998 Wiley-VCH publication.

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