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BOOK REVIEW

Aerosols: Generation and Role in Medicine, Industry and Environment. K. S. V. NAMBI and B. K. SAPRA, Indian Aerosol Science and Technology Association, Mumbai, Allied Publishers Limited, New Delhi, Mumbai, Calcutta, Nagpur, Ahmedabad, Bangalore, Hyderabad, Lucknow (1998). 314 pages.

This book contains a number of review-tutorial papers of actively working scientists mainly from India (only two publications of 21 belong to European authors and one article is presented from Japan). The papers are collected into chapters corresponding to the traditional division of Aerosol Science into branches: Basic Studies, Aerosol in Medicine, Aerosols in Industry, Nuclear Aerosols, and Aerosols in Environment.

The introductory chapter written by the Editors helps a generally educated reader to enter the circle of problems resolved by Aerosol Science. Here, one finds the classification of aerosols, short descriptions of their manifestation and numerous applications of aerosols. According to Editors' opinion the book "certainly will be useful to those who are interested in collecting material for international reviews".

The first chapter "Basic Studies" contains four presentations devoted to rather diverse problems of Aerosol Physics: Microgravity (the specifics of aerosol particle behavior in weak gravitation fields), recent achievements in the theory of coagulating aerosols related mainly to the fractal concept, the role of nucleation processes in the atmosphere and theoretical and experimental studies of the formation of binary aerosol particles.

Specifics of medical application of aerosols are described in three papers included into the second chapter "Aerosols in Medicine". Here, a review of diagnostic applications of radioactive aerosols and two shorter presentations on application of drag aerosols for inhalation therapy, the generation and delivery of aerosol into human respiratory tracts await the reader.

The paper considering highly productive plasma aerosol generator opens chapter "Aerosols in Industry". Plasma generators are shown to be an effective tool for producing submicron and micron particles of oxides, carbides and nitrides. Testing the air cleaning systems by aerosols with special reference to aerosols for testing HEPA filters is briefly reviewed in the second paper. An overview of recent advances in material synthesis and surface coating by plasma aerosols is presented in the third paper of this chapter. High temperature of plasma processes coupled with some thermochemical effects help to realize a variety of aerosol coating processes. The technology and materials of aerosol painting are described in the fourth presentation.

The chapter on nuclear aerosols begins with an overview of the transport of radioactive aerosol particles and their behavior in the context of nuclear reactor safety. The paper reviews the sources of nuclear aerosols, their characteristics, theoretical and experimental aspects of nuclear aerosols processes and their transportation in the atmosphere. The second article of this chapter is devoted to the characterization of radioactive aerosols for inhalation hazard assessment. Mass concentration, isotopic composition and solubility of inhaled aerosol particles are discussed together with the methods for studying their deposition in lungs and other parts of the respiratory tract. The last paper of this chapter describes the application of radioactive aerosols in studying aerosol transport processes in the atmosphere and estimating ventilation rates in dwellings.

The last third of this book reviews the problems of environmental aerosols. The general properties of atmospheric aerosols, their characterization and effect on the global environment (aerosols and climate changes, origination of acid rains and ozone depletion) are the

focus of the first paper of this chapter, where results of simultaneous PIXE analysis of the size distribution, water solubility and chemical composition of atmospheric aerosol particles are reported. The second paper focuses on the meteorological aspects of atmospheric aerosols. Aerosol measurements are shown to be able to provide useful information on the air streams in the atmosphere, monsoon activity, climatological trends and cloud characterization. The climate aspects of atmospheric aerosols are discussed in the third paper in connection with some measurements over the Arabian Sea and Indian Ocean. The results of simultaneous measurements of aerosol optical depth, size distribution and incoming solar radiation flux are analyzed in view of the climatic role of desert aerosols and their interaction with anthropogenic contamination and sea components of the air masses. The fourth paper deals with the study of aerosol characteristics and their role in influencing the transfer of solar radiation in the atmosphere. Recent developments concerning inversion of impactor data are discussed together with empirical routes for obtaining the vertical profile of aerosol optical thickness. Factors influencing indoor aerosol are analyzed in the fifth paper. Future directions necessary for correct exposure assessment are summarized. The next paper considers interactions of polycyclic aromatic hydrocarbons (PAH) with urban aerosols including the properties, mechanisms of formation and gas–particle partitioning of PAH. Atmospheric PAH are shown to concentrate in fine and ultrafine particles which stipulates their long residence in the atmosphere and significant lung penetration. The methods of pollen sampling and related medical problems are reviewed in the last paper of this book.

The book will undoubtedly be of great use for the beginners in Aerosol Science. It introduces the reader to a wide range of aerosol problems and cites quite a reasonable (not exhaustive but modern) bibliography.

ALEX A. LUSHNIKOV
Karpov Institute of Physical Chemistry,
10, *Vorontsovo Pole*, 103064 *Moscow*,
Russia.