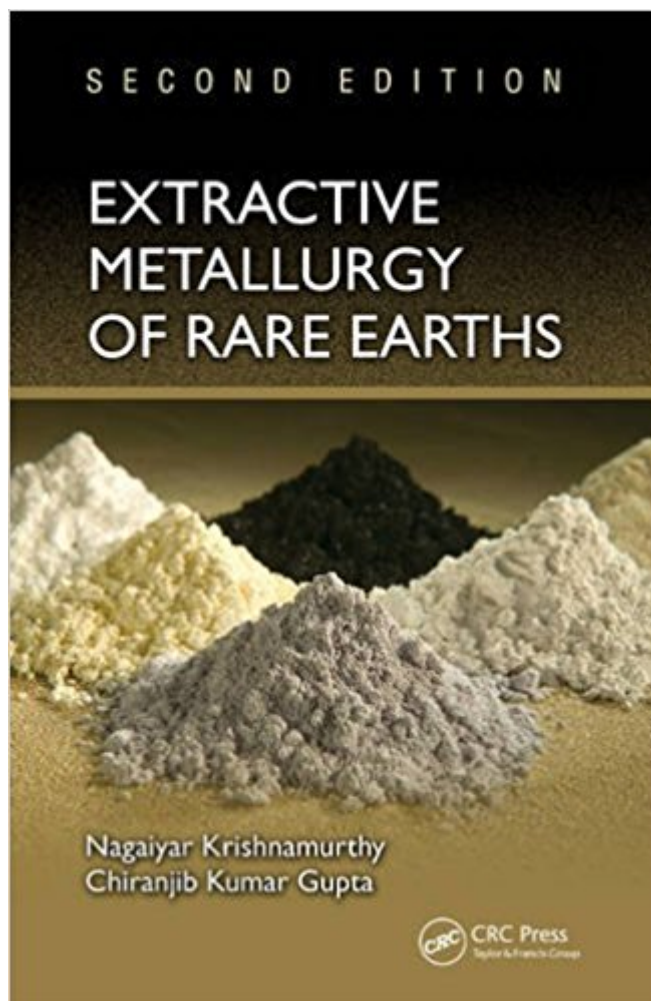


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# Extractive Metallurgy Of Rare Earths, Second Edition



## Synopsis

New Edition Now Covers Recycling, Environmental Issues, and Analytical Determination Employing four decades of experience in the rare metal and rare earths industry, the authors of *Extractive Metallurgy of Rare Earths*, Second Edition present the entire subject of rare earth elements with depth and accuracy. This second edition updates the most important developments from the past 10 years. It emphasizes advances made in rare-earth materials processing (converting a rare-earth metal, alloy, or compound to a device-ready material), breakthroughs in the area of rare-earth separation, and now includes a chapter on the recycling of rare earth elements from magnets, batteries, and phosphors among others, covering both manufacturing scrap or materials in end of life devices. Essential to Your Collection This second edition presents comprehensive, detailed, and up-to-date coverage that includes:

- All aspects of rare earth extractive metallurgy
- A status of rare earth extraction from various world resources
- Flow sheets that can be used for rare earths separation, metal reduction, alloy making, refining and end product materials preparation
- Techniques of various rare earths recycling options
- An outline of environmental issues in rare earths mining and processing
- Methods of rare earths determination and analyses of components and impurities in rare earth materials
- Information extensively linked to primary literature with a complete listing of references
- A narration of the changing scenario of world rare earth resources and possibility of their exploitation

An indispensable resource, *Extractive Metallurgy of Rare Earths*, Second Edition explains the many aspects of rare earth extractive metallurgy clearly and systematically. The text reveals process implementation possibilities and research opportunities, and considers potential solutions to the challenges impacting this rapidly changing industry.

## Book Information

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## Customer Reviews

"For geologists, chemists, metallurgists, and students, it covers everything they want to know about rare earths • in short it is [the] book of the year."Fathi Habashi, Laval University, Quebec, Canada

"Rare earth elements are finding increasing application in advanced technologies. The book is useful in bringing together the extensive information that is available about the potential sources of these elements and the technologies used to process them. • [This is a timely update of a valuable reference source."•Peter Hayes, The University of Queensland, Australia "This book is an update to a very well written and valuable reference text that has capitalized on an important and scarce commodity. It provides invaluable information on a very important aspect of the development of green energy. Rare earth magnets have become essential components in a wide variety of technical advancements (windmills, Chevy Volt, etc.)."•Patrick R. Taylor, Colorado School of Mines, Golden, USA "[A strength of this book is] the completeness of the coverage. The addition of a recycling chapter is a good idea. • | This is a timely update of a book that is already important. The sooner it appears in print, the better. "•Mark E. Schlesinger, Missouri University of Science and Technology, Rolla, USA "This is the best, most comprehensive, most up-to-date technical book on rare earths—• a massive encyclopedic compilation without equal. The new edition, more than 300 pages longer than its predecessor (1st ed., 2004), was updated to include discussions of advances in the field and recycling. Krishnamurthy (Homi Bhabha National Institute, India) and Gupta (formerly, Bhabha Atomic Research Centre) organized the volume into 12 chapters. They begin with an introduction to the history, properties, and applications of the rare earths, followed by a discussion of geology, minerals, and specific occurrences worldwide. Later chapters cover processing (mining, beneficiation, etc.); reduction to the metals, including the chemistry and physics of different methods; metal refining processes; rare earth materials and their applications; recycling; "accurate and reliable techniques" for chemical characterization and analyses of rare earth materials; and environmental issues and select examples from many areas worldwide. The text is strongly and appropriately augmented by numerous tables, charts, and illustrations. Most outstanding is a reference list of about 1,260 items that deal with the many subtopics addressed. The book's value lies in its complete coverage of essential knowledge of rare earth metals, including their technology and uses." •CHOICE, September 2016

Dr. Nagaiyar Krishnamurthy was affiliated with the Materials Group, Bhabha Atomic Research Centre, Mumbai, India, for nearly four decades. He earned his BS degree at the University of Madras in 1974, his MSc in 1980, and his PhD in 1992, both at the University of Bombay. He is a professor at the Homi Bhabha National Institute and has been a member of Indian Rare Earths Technology Development Council. In addition, Dr. Krishnamurthy has published more than 100 papers and co-authored three books that include the first edition of Extractive Metallurgy of Rare Earths, published by CRC in 2004. Dr. Chiranjib Kumar Gupta retired as the director of Materials Group, Bhabha Atomic Research Centre in January 2000 after decades of association with BARC. He was instrumental in formulating and directing the programs of the Materials Group in the areas of extraction and processing of refractory metals and materials. He pioneered the open aluminothermic reduction as a process of metal- and alloy-making and contributed extensively to the use of fused salt electrolysis for the preparation and refining of group V and VI refractory metals. He is an alumnus of Banaras Hindu University. Dr. Gupta has authored nearly 200 publications.

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