

The Rare Earth Elements: An Introduction (SpringerBriefs in Earth Sciences)

J.H.L. Voncken



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This book deals with the rare earth elements (REE), which are a series of 17 transition metals: scandium, yttrium and the lanthanide series of elements (lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium).

They are relatively unknown to the wider public, despite their numerous applications and their critical role in many high-tech applications, such as high-temperature superconductors, phosphors (for energy-saving lamps, flat-screen monitors and flat-screen televisions), rechargeable batteries (household and automotive), very strong permanent magnets (used for instance in wind turbines and hard-disk drives), or even in a medical MRI application.

This book describes the history of their discovery, the major REE ore minerals and the major ore deposits that are presently being exploited (or are planned to be exploited in the very near future), the physical and chemical properties of REEs, the mineral processing of REE concentrates and their extractive metallurgy, the applications of these elements, their economic aspects and the influential economical role of China, and finally the recycling of the REE, which is an emerging field.

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