



Department of Materials Science and Engineering

Presents EC Subbarao Lecture

“Beach Sand Minerals processing for materials – prospects and challenges”

Dr. R N Patra

CMD, IREL

Date	:	Nov 30th 2013 (Saturday)	Time	:	12:00 noon
Venue	:	L-9	Tea:		11:45 am

Abstract:

Beach sand minerals (BSM) are a suite of seven minerals viz. ilmenite, rutile, leucoxene, zircon, sillimanite, garnet and monazite. These minerals are also known as Heavy Minerals (HM), as their densities range between 3.2 to 5.2 gram/cc which are higher than that of silica or quartz constituting the bulk of gangue materials in the beach sand. The first three of these minerals are titanium bearing minerals and they are mostly oxides of iron and titanium. The next three are silicates of zirconium (zircon), aluminium (sillimanite) and iron aluminate (garnet). The last of the BSM is a phosphate of rare earths and thorium which render the mineral radio-active and is the only commercial source of rare earths in India.

The BSM are separated from each other to their mineralogical purer forms by taking advantages of their differences in size, density, electrical and magnetic properties. The titanium, zirconium and rare earths find vast number of applications in ceramic metallurgical, phosphor, magnetics and electronics sector, where as thorium is a potential source of future nuclear power generation in India.

The subject matter of the talk focuses on prospects and challenges in developing the process technologies of various value added products from these minerals and their myriad of applications in the above mentioned industry sectors which are ever evolving with time. During the 30 minutes of my deliberations, I will attempt to highlight the main technological challenges in developing various value added products based on these minerals.

About the Speaker:

Dr. R. N. Patra, Chairman & Managing Director of Indian Rare Earths Limited (IREL), a Govt. of India Undertaking under the Department of Atomic Energy (DAE), has wide range of experience spanning research and development of desalination systems, designing and commissioning of plants under the Technology Commissions Programme of the Govt. of India for supply of drinking water to villages, operation of metallurgical process plants and marketing of industrial minerals.

Dr. R.N. Patra, a graduate in Chemical Engineering with Honours from IIT, Kharagpur started his career in the Bhabha Atomic Research Centre at Trombay, Mumbai. Subsequently he has obtained his Ph.D in Chemical Engineering (Reverse Osmosis/hyper filtration) from IIT, Mumbai.

Dr. Patra joined Indian Rare Earths Ltd. In 1989 on deputation from BARC and worked as Plant Manager of its chemical plant at its Orissa Sands Complex (OSCOM) Project at Odisha. He also held the position of Factory Manager of its Thorium Plant at Trombay. Dr. Patra was holding the position of Chief General Manager (Marketing) in the Corporate Office at Mumbai before taking up the assignment as Director (Technical) in 2006.

Dr. Patra took over as the Chairman & Managing Director of the Company in 2009.

About EC Subbarao Lecture Series

Dr. Eleswarapu Chinna Subbarao received BSc (Glass Technology) (1949) from Banaras Hindu University (BHU), BS (1952) and MS (1954) degrees in Ceramic Engineering from the University of Washington, Seattle; and PhD (Ceramic Technology) (1957) from the Pennsylvania State University. His doctoral thesis pioneered work on domain effects in ferroelectric ceramic barium titanate. He worked at Westinghouse Research Laboratories, Pittsburgh, PA (1956-63). In 1963, he joined IIT Kanpur, worked there as first Head of Metallurgical Engineering Department.; then as Founder-Director, Tata Research Development and Design Centre, Tata Consultancy Services, Pune.

Dr. Subbarao organized the first conference on Materials Science Education in India (1966) and established an interdisciplinary postgraduate programme in materials science at IIT Kanpur, also an Advanced Center of Materials Science, thus ushering in material science education and research in India. He was the first Dean of Faculty at IIT Kanpur and played a pivotal role in assembling world-class faculty at the IIT. He served on the Editorial boards of many national and international journals. He also served as Member, INSA Council (1982-84).

Professor Subbarao received the INSA Prize for Materials Science (1995), National Metallurgists' Award (1970), Homi Bhabha Award in Applied Science (1978), ID Varshnei Memorial Lecture Award (1987), Distinguished Materials Scientist of the Year by MRSI (1991), NP Gandhi Memorial Lecture Award (1995), Distinguished Alumnus of the Institute of Technology, Banaras Hindu University (1998), and Honorary Fellow of IIT Kanpur (2006). He was elected Fellow of the Indian Academy of Sciences, Bangalore, Indian National Academy of Engineering and the International Academy of Ceramics.

