Glenn T. Seaborg Center Presents

Advances in Rare Earth Separation and Clean Metallurgy in China

Prof. Deqian Li

Former Director for Rare Earth Research

Changchun Institute of Applied Chemistry
Chinese Academy of Sciences, China

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Rare earth elements (REEs) are important materials in many high-tech applications. Thorium is a safer and more abundant nuclear energy source than uranium. The application of rare earth elements and thorium are attracting more and more attention worldwide. The world's largest deposit of rare earths is found at Baiyunebo in Inner Mongolia, China, where bastnasite and monazite co-occur as associated minerals in iron ores.

An overview of the rare earth resources, research and production in China will be provided. Then the focus of the presentation will be on the research and development of rare earth separations performed at Changchun Institute of Applied Chemistry (CIAC). The separation processes exploited by CIAC using solvent extraction technology based on organophosphoric acid (P507), naphthenic acid, primary amine (N1923) and organophosphine oxide (Cyanex923) for REEs and thorium are widely used in China, producing all the individual REEs with extremely high purities on an industrial scale. Both the old processes of REEs metallurgy in use and the new processes of REEs metallurgy under development will be introduced. Emphasis will be placed on the extraction thermodynamics and kinetics, and the industrialization of some novel extraction systems for yttrium, thorium and heavy REEs.

Host: Linfeng Rao (510) 486-5427 LRao@lbl.gov Admin. Assistant: Catherine Mendez (510) 486-5587

Ernest Orlando Lawrence Berkeley National Laboratory
One Cyclotron Road | Berkeley, California 94720 | Tel: 510.486.4000