RARE-EARTH INFORMATION CENTER INSIGHT

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Competition Is Heating Up!

News about new deposits and sources of rare earths has been quite forthcoming. Some time this year Companhia Vale Do Rio Doce's plant for producing TiO_2 concentrates for pigment manufacturers from anatase in Tapira, Brazil is to become operational. As much as 8,000 tons of rare earth oxides per year will be produced as a by-product, assuming 500,000 tons/year of anatase concentrate are processed. The europium and yttrium contents are reported to be high.

Also scheduled for a 1988 startup is the Olympic Dam deposit in South Australia which contains an unusual combination of uranium, copper and gold minerals intimately associated with hematite. The light rare earths, associated with the uranium minerals (mainly uraninite), will be produced as a by-product.

Other news from Australia indicates that the mineral sands producers of rutile, ilmenite and zircon are gearing up to increase production, especially zircon since the demand is well in excess of supply. Since monazite is a by-product of these processed sands, more rare earth ores and concentrates should be available from these sources.

Further down the road explorations have turned up more rare earth deposits. Exploration in Greenland has turned up rare earths and niobium-tantalum in alkaline intrusive complexes. One of the best deposits is a pyrochlore mineral formed from hydrothermal veins which contain 3 to 13% rare earths, predominately the lights. This deposit is located at Ilimaussuit, in southern Greenland. Another niobium-tantalum bearing pyrochlore alkline complex, also located in southern Greenland at Motzfeldt Center, contains large amounts of ZrO_2 and rare earths, including yttrium. The rare earth percentage is low, but can be upgraded as a by-product of the benefication of the Nb_2O_5 and Ta_2O_5.

On the western side of North American the U.S. Bureau of Mines has identified a significant deposit of rare earths which is high in yttrium (~50% of the rare earth content) in southeast Alaska at Bokan Mountain on Prince Wales Island. This deposit contains 0.5 to 1.0% rare earth oxide together with a number of other valuable metals, including Zr, Hf, Li, U, Be, Nb, Ta, Ga, Ge, Au and Pd. Other rare earth deposits are found throughout Alaska, mostly in an east to west band through the central part

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of the state north of Fairbanks. These deposits, and including those in the 48 contiguous states, should make the USA self-sufficient in the rare earth materials, including yttrium and heavies for many years to come.

Scientists in Jamaica, especially at the Bauxite Institute, are looking into the feasibility of recovering rare earths from the waste discharge from bauxite processing (the so-called Jamaican Bayer muds). These muds contain significant amounts of scandium, yttrium and lanthanides (e.g. 0.014% Sc, 0.050% La, 0.066% Ce, 0.002% Eu). This bauxite waste is a different source of the rare earths. If a viable method could be found to extract the rare earths economically, this would amount to a vast increase in the resources of available rare earth materials, especially if other bauxite sources in the world contain similar amounts of the rare earths. The major advantage of these muds is that the levels of radioactive nuclides are insignificant.

A new vast Australian ore deposit has been found in Victoria which contains sufficient monazite and xenotime (~3% of the total heavy minerals) to more than double Australia's reported reserves. This deposit primarily contains various titanium minerals (i.e. rutile, anatase, leucoxene and ilmenite) and zircon. The rare earth oxide content totals more than 400,000 tons and consist of about 3.5 parts monazite to 1 part xenotime.

We have also had some unconfirmed information about another large deposit of rare earths in the Northern Territory of Australia. As soon as we have additional information on this deposit we will inform our RIC Insight readers.

At the present rate of exploration and development the world's rare earth reserves are increasing faster than the rare earths are being mined. As we well know the rare earths are abundant and not scarce — Amen.

Re Geochemistry for the Layman

Have you ever wondered how the rare earths were distributed where they are in various deposits throughout the world? For those of you who do not have a strong geochemical bent (like the editor) we highly recommend a recent article which appeared in the January 1988 issue of Sci. Amer. **258**, 72-77. The article, "The Not-So-Rare Earths", by G. K. Muecke and P. Möller is quite readable and explains how and why we have bastnasite, monazite and xenotime deposits, and some other interesting features, such as why there may be an europium depletion in some sedimentary deposits.

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