SPEAKERS

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Critical Minerals – Ensuring America’s Future

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China Is Said to Halt Trade in Rare-Earth Minerals With Japan

By KEITH BRADSHER and HIROKO TABUCHI
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HONG KONG — Akihiro Ohata, the Japanese trade minister, said Friday that his ministry was aware that Japanese traders were complaining of a halt from China of a crucial category of minerals and that the government was investigating the matter.

The Chinese Commerce Ministry has denied that China...
Historical Perspective

- **WWI & WWII**
  - War Dept., 1922: antimony, chromium, graphite, iodine, manganese, mercury, mica, nickel, platinum, potash, tin, tungsten, vanadium
  - 1939: plus aluminum, asbestos, cadmium, cryolite, fluorspar, titanium
  - *Strategic and Critical Materials Stock Piling Acts of 1939, 1946*

- **Oil Embargo of 1970s**
  - Rising commodity prices
  - *Strategic and Critical Materials Stock Piling Revision Act of 1979*
  - *National Materials and Minerals Policy, Research and Development Act of 1980*

- **Resource War of 1980s**
  - Concern that USSR was denying access to strategic resources needed for U.S. economy and defense
  - Concern about increasing import dependence
  - Research by government and academia on Chromite, Cobalt, Manganese, …
  - *International Strategic Mineral Inventory (ISMI)*
  - *The National Critical Materials Act of 1984*

- **Rise of Developing Economies in the 21st Century**
  - Concerns about reliable supply
  - National critical mineral strategy development – multiple OSTP working groups
  - *Currently several bills pending in 113th Congress*
World Trade

Although the US is a major producer and exporter of many commodities such as molybdenum and beryllium, it relies on world trade for most mineral resources and is >90% reliant on imports for 24 commodities, including REE.

Source: USGS Mineral Commodity Summaries (2013)
REE Production Trends – 1956 to 2010

Sources: USGS Fact Sheet 087-02 updated with recent USGS Minerals Yearbook data
Information is Critical


Minerals Information

Materials Flow Studies
Facilities in impact zone of March 11, 2011, magnitude 9.0 earthquake and associated tsunami:

- 9 cement plants
- 8 iodine plants
- 4 iron and steel plants
- 4 limestone mines
- 3 copper refineries
- 2 gold refineries
- 2 lead refineries
- 2 zinc refineries
- 1 titanium dioxide plant
- 1 titanium sponge processing facility.

These facilities have the capacity to produce the following percentages of the world’s nonfuel mineral production:

- 25% of iodine (Japan is world’s second leading producer (after Chile))
- 10% of titanium sponge (metal)
- 3% of refined zinc
- 2.5% of refined copper
- 1.4% of steel

The 9 cement plants produce 30% of Japan’s annual cement production.

**Inventory**

Identified resources
Near- and medium-term supply
Often classified by commodity
Important first step for assessment

**Assessment**

Undiscovered resources
Long-term potential supply
Classified by mineral deposit type
Qualitative and Quantitative

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**Where**

**How much**

Probabilistic
Indonesia is included in a report on parts of Southeast Asia and Melanesia.
ASTER alteration mapping as a guide for porphyry copper estimates in Central Asia

Tract area: 79,500 km²
5 known deposits
90-50-10 Estimate: 1-5-12
5.8 expected undiscovered
Old ground vertical gradient, calculated

New airborne vertical gradient, measured
New USGS Laser Ablation Bulk ICP-MS Method

- Low cost, efficient, and accurate analytical method
- Entire periodic table (minus H, He, N, O and F) in a single rapid analysis
- Trace and ultra trace detection (ultra trace to less than 10 ppb in some cases)
- 100+ analyses per day
New National-scale Soil Geochemical and Mineralogical Data for the Conterminous United States

4,857 sites (1 site/1,600 km²); >14,400 samples, 2007-2010

http://pubs.er.usgs.gov/publication/ds801
Lead in C horizon

C_Pb ppm

0.28 - 7.61
7.61 - 10.05
10.05 - 12.50
12.60 - 14.94
14.94 - 17.38
17.38 - 19.82
19.82 - 22.26
22.26 - 24.71
24.71 - 32.03
32.03 - 623.05

0 400 800 1,600 Kilometers
Lead in 0 to 5 cm
General information:
minerals.usgs.gov/

Products available online at:
minerals.usgs.gov/global/
minerals.usgs.gov/minerals

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