MINERALS ARE CRITICAL TO A RENEWABLE FUTURE

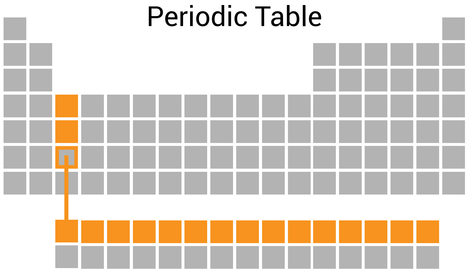
RARE EARTH ELEMENTS

Alaska may hold what the nation needs to innovate for tomorrow

Rare Earth Elements (REE) are a group of **17** metals that cannot be separated into simpler substances by chemical means, which is why they appear together in the periodic table. They occur abundantly on earth but are rarely found in concentrations high enough for economical extraction; thus their REE nickname.

They are soft, malleable, and ductile and usually reactive, especially at elevated temperatures or when finely divided. The rare earth elements' unique properties are used in a wide variety of applications.

Periodic Table



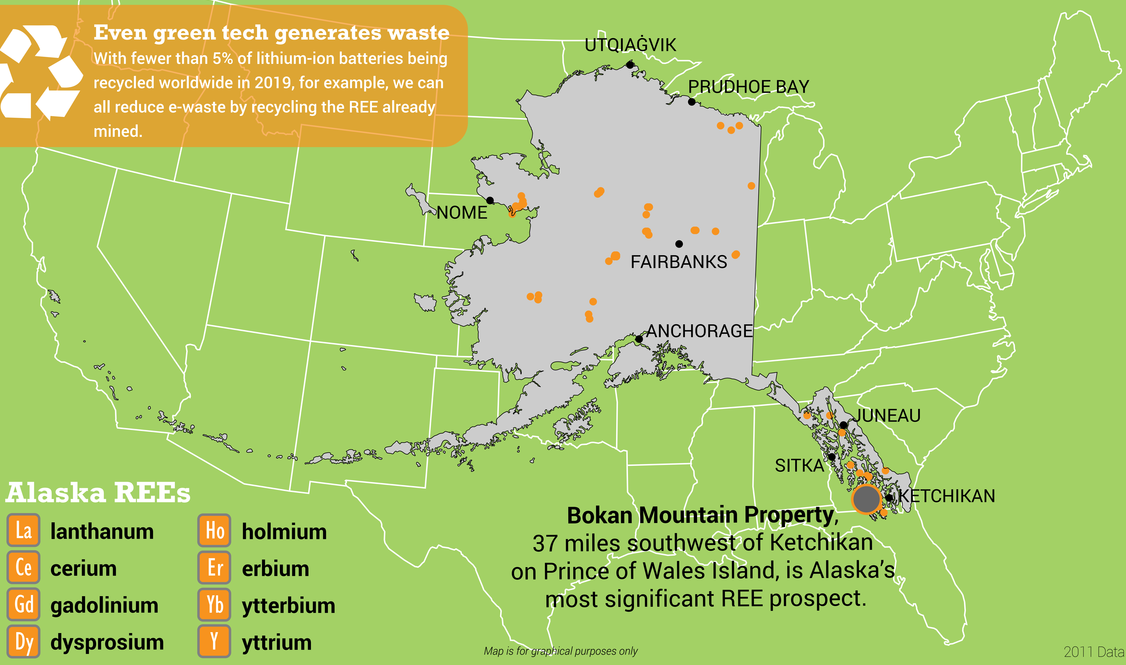
15 within the chemical group called LANTHANIDES plus SCANDIUM and YTTRIUM

RARE EARTH ELEMENTS

La Ce Pr No Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Sc Y

Occurrences in Alaska

Even green tech generates waste
With fewer than 5% of lithium-ion batteries being recycled worldwide in 2019, for example, we can all reduce e-waste by recycling the REE already mined.



Alaska REEs

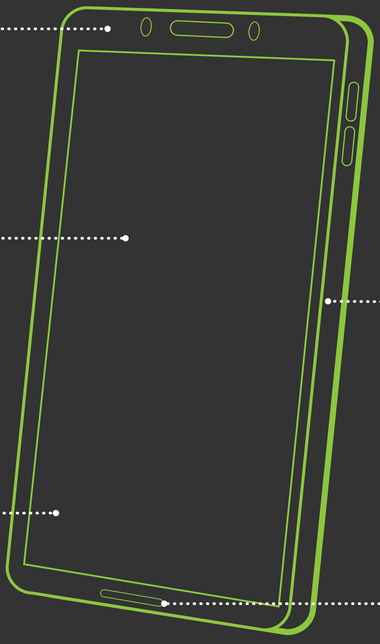
- La lanthanum
- Ce cerium
- Gd gadolinium
- Dy dysprosium
- Ho holmium
- Er erbium
- Yb ytterbium
- Y yttrium

Bokan Mountain Property, 37 miles southwest of Ketchikan on Prince of Wales Island, is Alaska's most significant REE prospect.

Map is for graphical purposes only

2011 Data

Rare Earth Minerals in Mobile Devices



Vibrator
Dysprosium
Neodymium
Praseodymium
Terbium

Color Screen
Dysprosium
Europium
Lanthanum
Neodymium
Praseodymium
Terbium
Yttrium

Glass polishing
Cerium
Lanthanum
Praseodymium

Circuit board electronics
Dysprosium
Gadolinum
Lanthanum
Neodymium
Praseodymium

Speaker
Dysprosium
Neodymium
Praseodymium
Terbium

For more information, visit https://www.blm.gov/alaska/minerals

References:
https://dggs.alaska.gov
https://www.usgs.gov
https://www.inl.gov
https://www.rare-earths.com