

THE USES OF RARE EARTH ELEMENTS

Tiny quantities of dysprosium can make magnets in electric motors

lighter by 90 percent, while terbium can help cut the electricity usage of lights by 80 percent.

–Lifton (2010): The Battle Over Rare Earth Metals

There has recently been a bit of a furor over the fact that, currently, China produces 90% of the world's rare earth metals. Special properties of these elements are making them extremely important in a lot of high-tech and alternative energy technologies.

Fiber-optic cables can transmit signals over long distances because they incorporate periodically spaced lengths of erbium-doped fiber that function as laser amplifiers. Er is used in these laser repeaters, despite its high cost (~\$700/kg), because it alone possesses the required optical properties.

–Haxel et al., 2005: Rare Earth Elements—Critical Resources for High Technology

The rare earths are so chemically similar that they're lumped together in one corner of the periodic table, which is why they have not been used a lot until now. Only recently has their influence on electromagnetic systems been discovered. Wikipedia has a good list of the elements with some of their uses.

Rare Earth Elements

La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71

Lanthanides

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Lr														

The rare earth elements.

Many people are worried about one country controlling so much of a single resource, especially since China cut its export quotas earlier this year. Fortunately, rare earth metals are found in places other than China, and, as the demand continues to outstrip supply, it's just a matter of time for high prices to to bring more mining and recycling projects into production.

Source: <http://montessorimuddle.org/2011/06/06/the-uses-of-rare-earth-elements/>