

# Rare earth elements set to become rarer

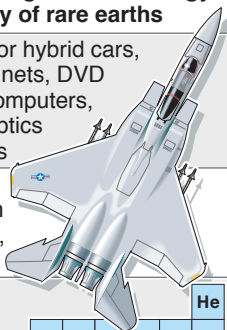
China's exports of rare earth elements fell 9.3 percent in 2010, deepening fears among Western governments of a coming shortage of the highly sought-after metals used in consumer electronics and green technology.

China produces 97 percent of the world's supply of rare earths

## RARE EARTH APPLICATIONS

Rechargeable batteries for hybrid cars, advanced ceramics, magnets, DVD players, wind turbines, computers, TVs, lighting, fibre optics and superconductors

**Weapons:** Guided missiles, night-vision goggles, laser range-finders, communications, stealth technology



## WHAT ARE RARE EARTHS?

17 non-ferrous metals on periodic table – *scandium, yttrium* and 15 *lanthanides\**

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Li	Be	17 non-ferrous metals on periodic table – <i>scandium</i> , <i>yttrium</i> and 15 <i>lanthanides</i> *										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	La-Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac-Lr	Rf	Db	Sg	Bh	Hs	Mt									

### Lanthanides

La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
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### Actinides

Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
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\*lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium

## Miniaturization

Rare earths allow for smaller, lighter batteries and motors, and are now key to making handheld devices such as Apple's iPhone

## RARE EARTH RESERVES

2009 (000s tonnes)

China	36,000
CIS*	19,000
United States	13,000
Australia	5,400
India	3,100
Brazil	48
Malaysia	30
World total	99,000

## RARE EARTH MINES

● Operating ● Under development



\*Commonwealth of Independent States