



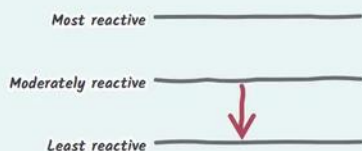
the reactivity series deciding how a metal is won from its ore, and how it is kept once won

Metals and non-metals compared

- metals are lustrous, malleable, ductile and good conductors of heat and electricity
- malleable means they can be beaten into sheets, and ductile means drawn into wires
- most are solid at room temperature, with mercury the exception, being liquid
- sonorous means they ring when struck, which is why bells are metal
- non-metals are generally brittle, dull and poor conductors, with graphite the exception that conducts
- chemically, metals lose electrons to form positive ions and non-metals gain them to form negative ions

The reactivity series, and what it decides

- the reactivity series ranks metals by how readily they lose electrons: K, Na, Ca, Mg, Al, Zn, Fe, Pb, H, Cu, Hg, Ag, Au
- a more reactive metal displaces a less reactive one from its compound, and never the other way round
- metals above hydrogen displace it from dilute acids, so they release hydrogen gas. Those below do not
- so copper, being below hydrogen, does not react with dilute hydrochloric acid at all
- the more reactive the metal, the more stable its compound and the harder it is to extract
- that single fact is what decides the extraction method, so the series is the backbone of the whole chapter



the series drawn as three rungs, the least reactive metals on the bottom rung and the most reactive on the top: climbing it makes the ore harder to break apart, which is exactly why the extraction method changes as you go up

Ores, and the first two steps *

- a mineral is any naturally occurring compound of a metal, while an ore is a mineral from which the metal can be extracted profitably. Every ore is a mineral, but not every mineral is an ore
- gangue is the unwanted earthy impurity mixed with the ore
- concentration removes the gangue, by froth flotation for sulphide ores, magnetic separation where one part is magnetic, or leaching with a chemical that dissolves the ore
- roasting heats a sulphide ore strongly in air, converting it to the oxide and releasing sulphur dioxide
- calcination heats a carbonate ore in limited air, driving off carbon dioxide to leave the oxide
- both steps aim at the same thing: turning the ore into an oxide, because oxides are what the next step knows how to reduce

