

C6.1.6 Extracting Metals

Links to previous lessons:

C4.1.6 Reactivity of elements

Metal displacement reactions

A more reactive metal will displace a less reactive metal from its compound

i.e. $M + NX \rightarrow MX + N$ where M and N are both metals and X is a non metal

This reaction will only work if M is more reactive than N

C3.3.1 Redox Reactions

OILRIG

Oxidation is loss of electrons

Reduction is gain of electrons

Oxidation is gain of oxygen

Reduction is loss of oxygen

Learning Objectives

- Describe how copper is extracted from ores
- Explain why some metals are extracted using carbon and others need to be extracted with electrolysis
- Write balanced symbol equations to represent the extraction of copper from its ore

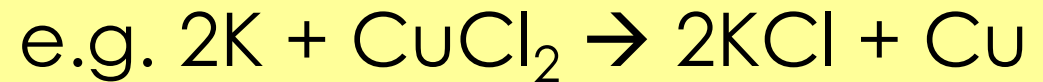
Definition

- An **ore** is a rock or mineral which contains enough metal to make it worth extracting the metal

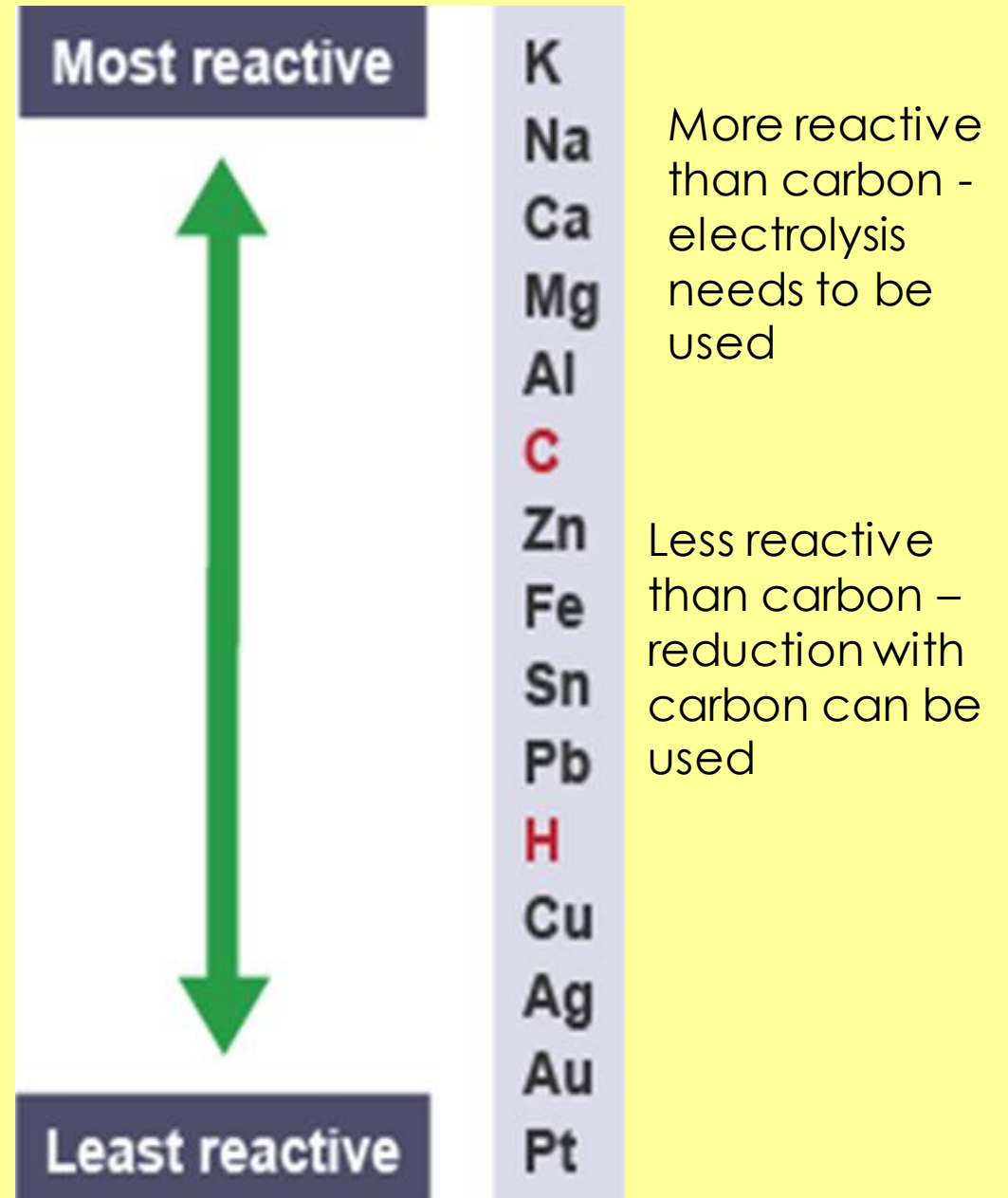
Revision: The Reactivity Series

Most reactive	K
	Na
	Ca
	Mg
	Al
	C
	Zn
	Fe
	Sn
	Pb
	H
	Cu
	Ag
	Au
Least reactive	Pt

- A more reactive element will displace a less reactive element from a compound



- A more reactive element will displace a less reactive element from a compound
- We can use this idea to extract metals from their ores
- We could also use electrolysis, but this is expensive due to the cost of electricity



Extraction using carbon

- Only used for metals less reactive than carbon

Metal oxide + carbon \rightarrow metal + carbon dioxide

Metal oxide + carbon --> metal + carbon dioxide

In terms of oxygen:

- The metal is reduced (loses oxygen)
- The carbon is oxidised (gains oxygen)

In terms of electrons:

- The metal is reduced (gains electrons)
- The carbon is oxidised (loses electrons)

Extracting Copper

Stage 1:

- Copper (II) sulfide + oxygen \rightarrow copper (II) oxide + sulfur dioxide



Stage 2: (REDOX reaction)

- Copper (II) oxide + carbon \rightarrow copper + carbon dioxide

