

EXTRACTION OF METALS

A T A G L A N C E

EXAMPLES



Pollution Sulphur in the fuel and sulphides in the ore gives rise to large amounts of sulphur dioxide.

METHOD USED DEPENDS ON ...

- ① Purity required
- ② Energy requirements
- ③ Position of metal in reactivity series
- ④ Cost of reducing agent

REDUCTION METHODS

- | | | |
|---|-----------------------------|-----------|
| ① | Metal oxide with carbon | IRON |
| ② | Metal oxide with metal | CHROMIUM |
| ③ | Metal halide with metal | TITANIUM |
| ④ | Metal oxide by electrolysis | ALUMINIUM |

BATCH v. CONTINUOUS

- | | |
|-------------------|---|
| Continuous | <ul style="list-style-type: none"> • saves energy in high temperature processes • ideal for large scale processes |
| Batch | <ul style="list-style-type: none"> • useful when small amounts are required • better when purity is important |

CHROMIUM

Impure



Chromite is reduced by heating with carbon.

Pure



- chromite is converted to chromium(III) oxide
- oxide is reduced using aluminium at high temperatures
- known as **active metal reduction**

TITANIUM



- reduction of TiCl_4 is carried out in an **atmosphere of argon** because titanium **reacts with oxygen** at high temperatures

ALUMINIUM



- electrolysis of alumina - purified from bauxite
- aluminium is above carbon in the reactivity series
- cryolite is mixed with the alumina to lower the melting point
- consumes vast amounts of electricity so H.E.P. is needed