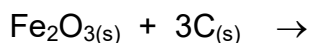


OXIDATION - REDUCTION: OXYGEN GAIN & LOSS

Thus early ideas concerning oxidation and reduction focused on oxygen gain and loss: on the basis of such a definition, the conversion of an element to its oxide would be viewed as **oxidation** while the removal of oxygen from a substance constitutes **reduction**. The reaction carried out as long ago as the iron-age, where iron ore is converted to iron by heating with charcoal epitomises this:



- 1 (a) Explain which substance is **oxidized** in the above reaction and state the product formed as a result ?

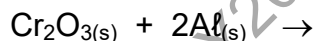
C is oxidized to **CO** as it has gained oxygen content [2]

- (b) Explain which substance is **reduced** in the same reaction and name the product that is formed as a result ?

[2]

REDuction and **OX**idation are complementary chemical processes – they never occur alone, except during electrolysis. Often such reactions are termed **REDOX** processes.

'*Thermit*' reactions are used industrially to isolate both manganese and chromium:



The substance responsible for bringing about the oxidation is termed the **OXIDIZING AGENT** and is itself **REDUCED**.

The substance responsible for bringing about the reduction is termed the **REDUCING AGENT** and is itself **OXIDIZED**.

- 2 (a) State which substance behaves as the **oxidizing agent** in the *thermit* process above.

[1]

- (b) State which substance behaves as the **reducing agent** in the same reaction.

[1]

It follows that a **GOOD OXIDIZING AGENT** is a substance which is easily **REDUCED** while a **GOOD REDUCING AGENT** is a substance which is easily **OXIDIZED**.

In fact, with the reactions encountered in elementary, pre-University chemistry, metals **ALWAYS** behave as **REDUCING AGENTS** in their chemical reactions, *i.e.*, when they react, they *always get oxidized*.