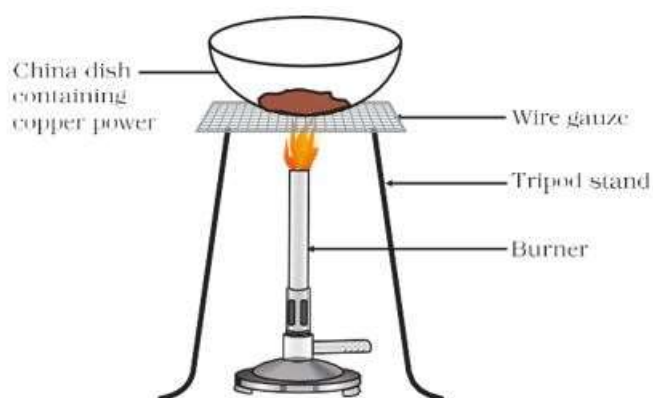


## OXIDATION AND REDUCTION

### Activity 1.11:



**Figure 1.10:** Oxidation of copper-to-copper oxide

- \* Heat a china dish containing about 1 g copper powder (Fig. 1.10).
- \* What do you observe?

The surface of copper powder becomes coated with black copper(II) oxide. Why has this black substance formed?

This is because oxygen is added to copper and copper oxide is formed.

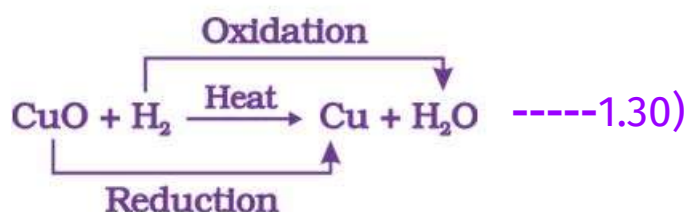


If hydrogen gas is passed over this heated material (CuO), the black coating on the surface turns brown as the reverse reaction takes place and copper is obtained.



If a substance gains oxygen during a reaction, it is said to be oxidised. If a substance loses oxygen during a reaction, it is said to be reduced.

During this reaction (1.29), the copper(II) oxide is losing oxygen and is being reduced. The hydrogen is gaining oxygen and is being oxidised. In other words, one reactant gets oxidised while the other gets reduced during a reaction. Such reactions are called oxidation-reduction reactions or redox reactions.



Some other examples of redox reactions are:



In reaction (1.31) carbon is oxidised to CO and ZnO is reduced to Zn.



In reaction (1.32) HCl is oxidised to Cl<sub>2</sub> whereas MnO<sub>2</sub> is reduced to MnCl<sub>2</sub>.

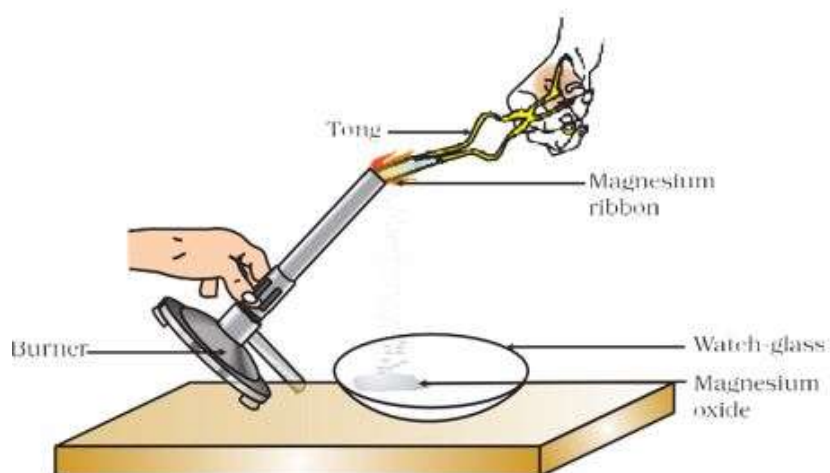
From the above examples, we can say that if a substance gains oxygen or loses hydrogen during a reaction, it is oxidised.

If a substance loses oxygen or gains hydrogen during a reaction, it is reduced.

### Questions:

1. Recall Activity 1.1, where a magnesium ribbon burns with a dazzling flame in air (oxygen) and changes into a white substance, magnesium oxide. Is magnesium being oxidised or reduced in this reaction?

### Activity 1.1:



**Figure 1.1:** *Burning of a magnesium ribbon in air and collection of magnesium oxide in a watch-glass.*

**CAUTION:** This Activity needs the teacher's assistance. It would be better if students wear suitable eyeglasses.

- \* Clean a magnesium ribbon about 3-4 cm long by rubbing it with sandpaper.
- \* Hold it with a pair of tongs. Burn it using a spirit lamp or burner and collect the ash so formed in a watch-glass as shown in Fig. 1.1. Burn the magnesium ribbon keeping it away as far as possible from your eyes.
- \* What do you observe?