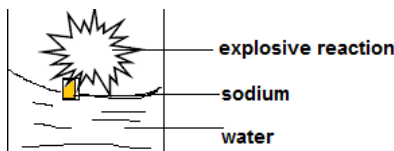
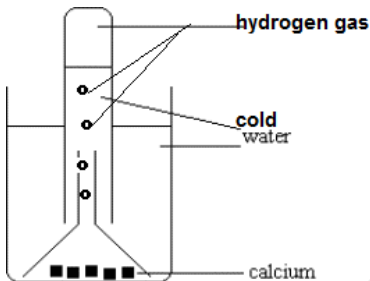
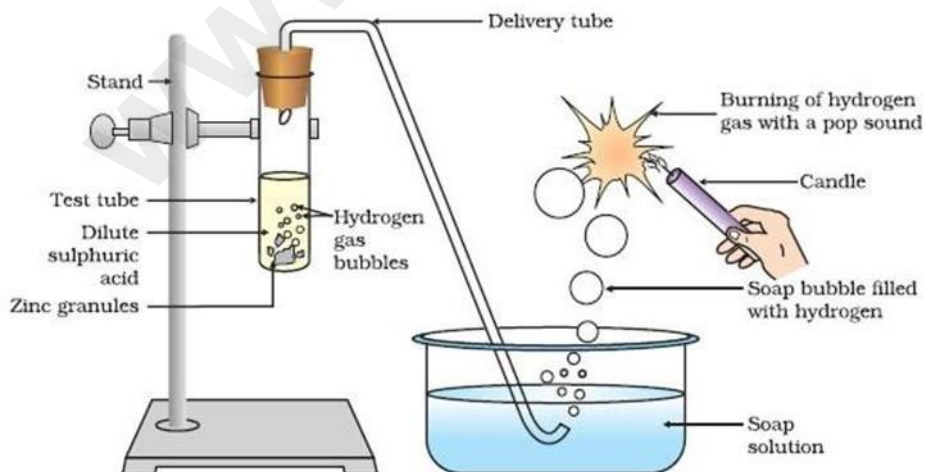


## ICSE CLASS 8 CHEMISTRY LESSON 2 HYDROGEN

	Hydrogen from water	Hydrogen from dil. HCl	Hydrogen from alkalis
Sodium and potassium	Violent explosive reaction with cold water  $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$	Violent explosive reaction to give NaCl and Hydrogen $2\text{Na} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2$	No action
Calcium	Reacts with cold water to form $\text{Ca}(\text{OH})_2$ and $\text{H}_2$  $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$	Gives calcium chloride and hydrogen $\text{Ca} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2$	No action
Magnesium	Reacts with boiling water to release hydrogen $\text{Mg} + \text{H}_2\text{O} \rightarrow \text{MgO} + \text{H}_2$	Gives magnesium chloride and hydrogen $\text{Mg} + \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$	No action
Zinc	Reacts with steam to release hydrogen $\text{Zn} + \text{H}_2\text{O} \rightarrow \text{ZnO} + \text{H}_2$	Gives zinc chloride and hydrogen $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$	Sodium zincate Because it is amphoteric $\text{Zn} + 2\text{NaOH} \rightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$
Iron	Red hot iron reacts with steam to release hydrogen $3\text{Fe} + 4\text{H}_2\text{O} \leftrightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$	Forms ferrous chloride and hydrogen $\text{Fe} + 2\text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$	No action

### Lab preparation of Hydrogen



### Properties of Hydrogen

- Pure hydrogen burns but it is a non-supporter of combustion

- Burns in oxygen with a blue flame to form steam  
 $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{Heat}$
- $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$  (hydrogen chloride gas)
- $3\text{H}_2 + \text{N}_2 \leftrightarrow 2\text{NH}_3 + \text{Heat}$  (ammonia manufacture)
- $\text{H}_2 + \text{S} \rightarrow \text{H}_2\text{S}$  (hydrogen sulphide gas with rotten eggs smell)
- $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$  (reducing action)

#### Uses of hydrogen

- Cutting and welding metals
- As fuel
- Hydrogenation of vegetable oil
- Manufacture of ammonia, methanol, HCl
- Hydrogen balloons