

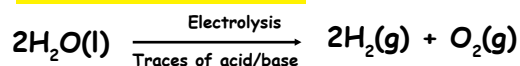
Occurrence: Most abundant in universe.

Preparation:

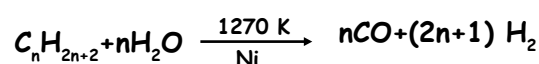
- Laboratory Method:



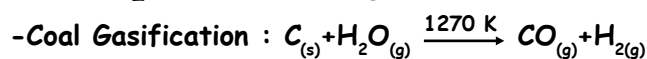
-Commercial Method:



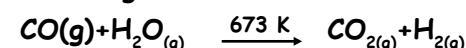
By electrolysing warm aqueous barium hydroxide
Solution between Ni electrodes.



-CO + H₂ is called water gas



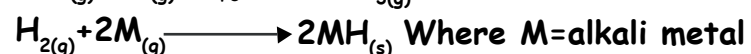
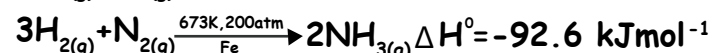
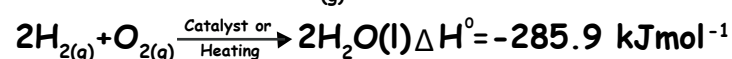
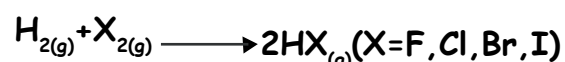
Water-gas shift reaction :



Physical Properties:

Colourless, odourless, tasteless and combustible
Lighter than air, insoluble in water.

Chemical Properties:



Uses:

- Synthesis of ammonia.
- In manufacture of vanaspathi fat.
- In manufacture of bulk organic chemicals.
- For manufacture of metal hydrides
- Preparation of HCl
- In metallurgical processes.
- As a rocket fuel.
- In fuel cells

Preparation

By exhaustive electrolysis of water

Uses

- As a moderator in nuclear reactors.
- In exchange reactions for the study of reaction mechanisms.

- Resembles alkali metals (lose one e⁻ to form unipositive ions)
- Resembles halogens (gain one e⁻ to form uninegative ion)
- Forms oxides, halides and sulphides
- Very high ionization enthalpy
- Does not possess metallic characters under normal conditions
- Forms diatomic molecules.

Protium: Predominant form. (^1_1H)

Deuterium: (^2_1H)

Tritium : Radioactive (^3_1H)

ISOTOPES

HYDROGEN

DIHYDROGEN

HEAVY WATER

PROPERTIES

HYDRIDES

WATER

HYDROGEN PEROXIDE

Uses

- As hair bleach, disinfectant
- Manufacture of chemicals used in detergents.
- In industries as bleaching agent
- In environmental chemistry

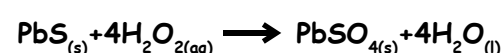
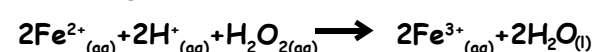
Physical properties

Colourless, miscible with water.

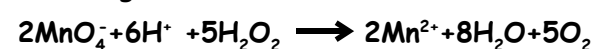
Structure : Non-Planar

Chemical Properties

1) Oxidising action in acidic medium



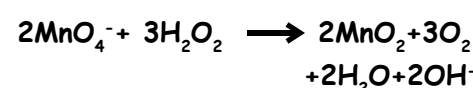
2) Reducing action in acidic medium



3) Oxidising action in basic medium



4) Reducing action in basic medium



TYPES

(i) Ionic/saline/salt-like

Stoichiometric compounds of dihydrogen formed with s-block elements

(ii) Metallic/non-stoichiometric/interstitial

Formed by d-block & f-block elements

(iii) Covalent/molecular

Formation of molecular compounds from dihydrogen and p-block elements

- Electron deficient (Group 13 hydrides)
- Electron Precise (Group 14 hydrides)
- Electron rich (Group 15, 16, 17 hydrides)

Temporary hardness

Removed by boiling, Clark's method. (Due to presence of magnesium and calcium hydrogen carbonates)

Permanent hardness

Removed by treatment with washing soda, Calgon's method, Ion exchange method, synthetic resins methods. (Due to presence of soluble salts of Mg & Ca in the form of chlorides and sulphate)

Preparation

