

- Sodium chloride is available as a solid that is excavated at salt mines or is obtained through evaporation of the ocean/ salt water.
- 3 products form out of electrolysis of Sodium chloride: chlorine, hydrogen and Sodium-hydroxide.

### Electrolysis of NaCl (aq)

- Oxidation at anodes:  $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$
- Reduction at cathodes:  $2\text{H}_2\text{O} + 2\text{e}^- \rightarrow \text{H}_2 + 2\text{OH}^-$
- Overall reaction:  $2\text{NaCl (aq)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH (aq)} + \text{H}_2\text{(g)} + \text{Cl}_2\text{(g)}$

### Chlorine $\text{Cl}_2$

- Yellow-green poisonous gas.
- HOCl – under chloric acid or hypo chloric acid.
- Water purification.
- Production of plastic.
- Production of pesticides.
- Production of bleaches.
- Extraction of Cu, Au, Ti.
- Solvents and antifreeze good.
- Production of hydrochloric acid.
- Making of colorants and paint.

## Inorganic Chemistry

### Hydrogen ( $\text{H}_2$ )

- Colorless, flammable gas.
- For production of hydrochloric acid.
- To make ammonia for fertilizers.
- Rocket fuel.
- Hydrogenation of the food industry to produce margarine.
- For welding operation.
- Production of  $\text{H}_2\text{O}_2$  for bleaching purposes.
- To produce Nylon.

### Sodium hydroxide NaOH (Caustic Soda)

- Alkalis (PH > 7), basis, soluble in  $\text{H}_2\text{O}$ ) and corrosive. .
- Production of soap and bleachers.
- Extraction of aluminum.
- Paper production.
- To supply other sodium salts.
- Making of textiles e.g. cotton and artificial silk.
- Water treatment of waste..
- Intermediate chemicals in other processes.