Strength of alkalis

- The **strength** of an alkali is defined by its ability to form hydroxide ions in the solution.

- In strong alkalis, the soluble base ionizes completely in the water to produce hydrogen ions.

Example

① Sodium hydroxide is completely ionized into sodium ions and hydroxide ions when in solution.

$$NaOH\ (s) \xrightarrow{water} Na^{+}\ (aq) + OH^{-}\ (aq)$$

- In a weak alkali, most of the molecules remain unchanged in the water. Only some of the molecules are ionized to release hydroxide ions. Some of the ions recombine into molecules again.

Example

① Ammonia is only partially ionized when it dissolves in water. Most of the ammonia molecules remain unchanged. This is why the scent of ammonia is detectable in aqueous ammonia.

$$NH_3\ (g) + H_2O\ (l) \rightleftharpoons NH_4^{+}\ (aq) + OH^{-}\ (aq)$$

- A few common strong alkalis and weak alkalis are listed below:

Strong Alkali	Weak Alkali
Sodium hydroxide	Ammonia
Potassium hydroxide	Ammonium hydroxide

Worked Examples

Example 1

Why does the skin feel soapy when it is covered with caustic soda solution?

Solution:

The hydroxides ions from caustic soda solution dissolve the natural oil in the skin, thus causing the soapy feeling.

Example 2

What phenomenon can be observed when iron (II) chloride solution and caustic potash solution are mixed? Write a balanced equation for the reaction.