Chemistry 201

Strong Acids and Bases

NC State University

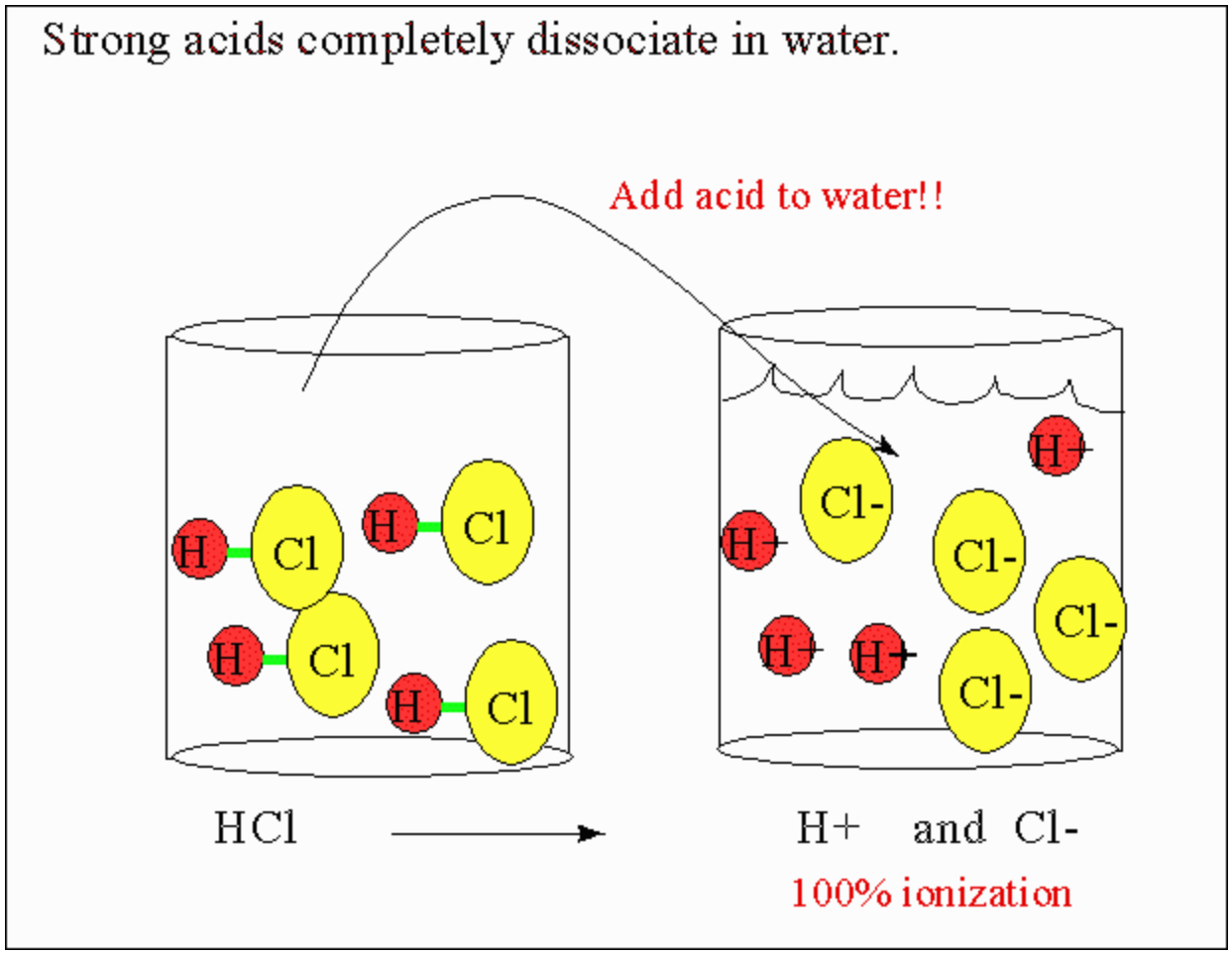
Strong acids

The list of strong acids is pretty short:
HCl, HBr, HI, … not HF
H_2SO_4, HNO_3, $HClO_4$….not H_2SO_3, HNO_2, HClO

In reality all acids have a pKa, but with strong acids we can assume that they will be 100% dissociated. That is what we normally do to simplify calculations.

For strong acids the dissociation is quite favorable such that the pK_a is negative.

Why does a strong acid dissociate?



Gas phase

Liquid phase

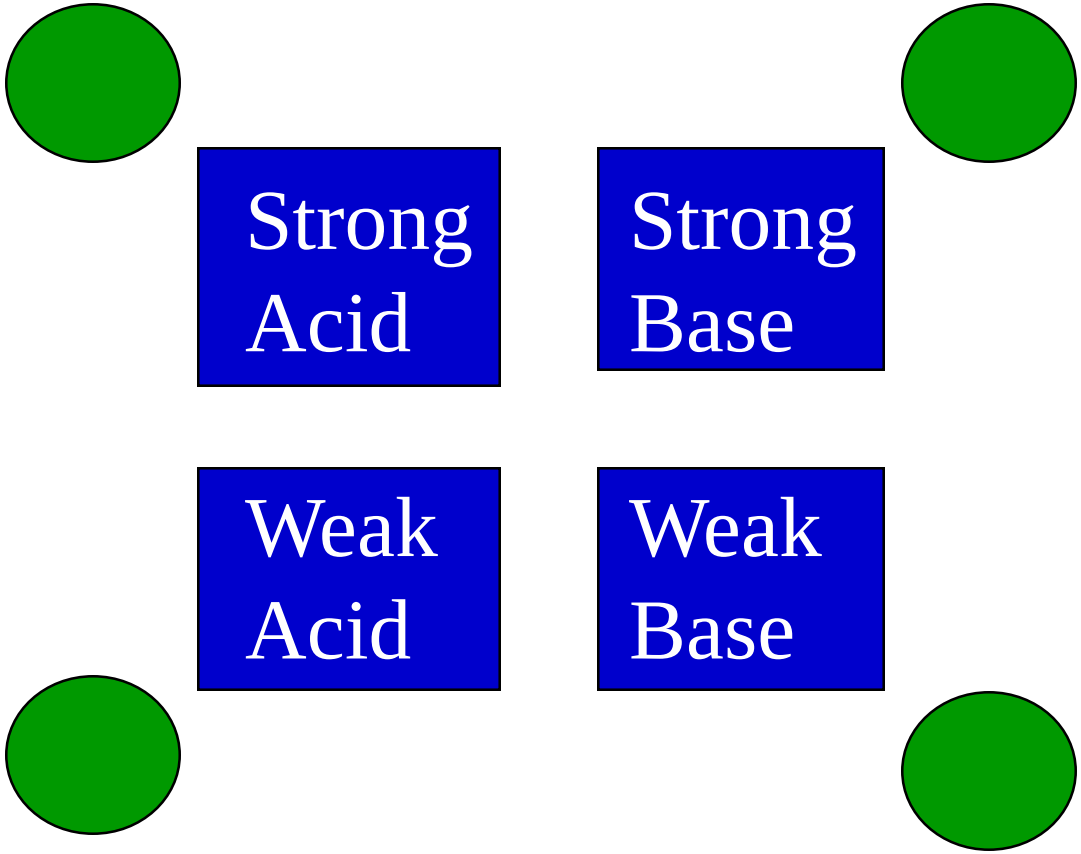
Calculation of pH for strong acids

For strong acids we can assume that the acid is 100% dissociated. Therefore the $[H_3O^+]$ is equal to the initial concentration of the acid. For this Reason we always know what the $[H_3O^+]$ is.

We calculate pH using the formula

$$pH = -\log_{10} [H_3O^+]$$

For strong bases the same considerations apply. However, in that case we know $[OH^-]$. We must use K_w to obtain $[H_3O^+]$, i.e. pH + pOH = 14


Strong Acid
Strong Base
Weak Acid
Weak Base

know $[H_3O^{1+}]$
calc pH

Strong Acid

Strong Base

Weak Acid

Weak Base

know $[H_3O^{1+}]$
calc pH

know $[OH^{1-}]$
calc pOH

Strong Acid

Strong Base

Weak Acid

Weak Base