

## C11-pH meter and pH measuring

### Principle :

pH measures water proton (ion  $H^+$  or  $H_3O^+$ ) concentration :  $pH = -\log_{10} [H^+]$  ; it defines the basic or acid properties of a solution.

if  $0 < pH < 7$  , solution is acid (  $1 \text{ mol / L} < [H^+] < 10^{-7} \text{ mol / L}$  )

if  $7 < pH < 14$ , the solution is basic (  $10^{-7} \text{ mol / L} < [H^+] < 10^{-14} \text{ mol / L}$  )

if  $pH = 7$ , the solution is neutral ,  $[H^+] = 10^{-7} \text{ mol / L}$

Furthermore,  $[OH^-] * [H^+] = 10^{-14}$

A pH sensor always consists of 2 electrodes :

- reference electrode : calomel electrode ( $Hg_2Cl_2$ , saturated KCl)
- measuring electrode : glass electrode

These 2 electrodes can be separated or combined : the latest are more common.

Some pH meters need temperature sensors.

### Calibration :

- first, immerse the electrodes in pH 7 buffer (Voltage = 0 V)

rinse the electrodes

- furthermore, immerse the electrodes in pH 4 or 10 buffer (it depends on the kind of solution you study).

### Maintenance :

Electrodes must be regularly rinsed, with drinking water.

The reference electrode must always be filled up with electrolyte (KCl 1, 2 or 3 mol / L, or saturated) ; some pH meters reference electrodes don't contain electrolyte but gel.

Read the notice in order to know in what kind of solution electrodes must be immersed during storage.

The glass electrode is very fragile and always must be hydrated.

Field of application : all types of water

☞ recommended drinking water pH : 6.5 to 8.5