

2-2. Theory of Reverse Osmosis Membrane

The phenomenon of osmosis is illustrated in the Figure below.

A semi-permeable membrane (RO membrane) is placed between two compartments. An RO membrane is consisted of a supporting layer with 50 μm in thickness and a barrier layer with about 0.2 μm in thickness. The phenomenon of osmosis occurs when pure water flows from a dilute saline solution in one compartment through the RO membrane into a higher concentrated saline solution in the other causing a rise in the height of the salt solution in the compartment of the higher concentrated solution.

The water flow will stop when the pressure of the column of the salt solution equals to the difference in chemical potential between the two aqueous solutions. The equilibrium point of the water column height in terms of water pressure against the membrane is called osmotic pressure.

If a force is applied to this column of water, the direction of water flow through the membrane can be reversed. This phenomenon is called reverse osmosis. This reversed flow produces pure water from the salt solution, since the membrane is not permeable to salt

