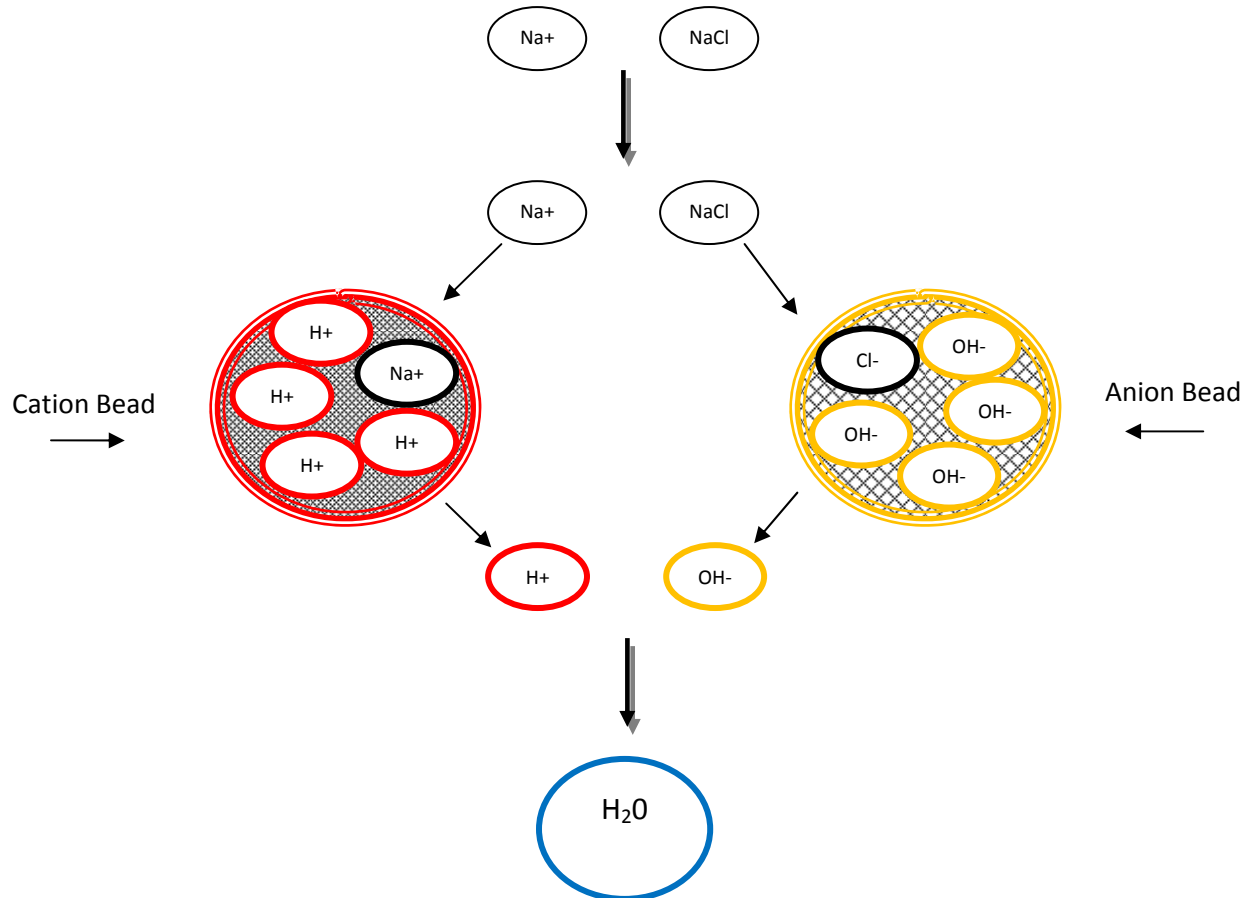




Basics of Ion Exchange



Starting from the top, you have NaCl or Sodium Chloride, which is a common salt. The NaCl is shown split in two, with Na^+ (sodium) on one side and Cl^- (chloride) the other side. The sodium represents any given ion that has a positive charge and the chloride represents any given ion that has a negative charge.

The two large circles represent ion exchange resin beads that are in their regenerated form.

The big circle on the left (with the red outline and H^+ circles in it) represents a strong acid cation ion exchange bead in the Hydrogen form. Each small cation bead has millions of exchange sites. An exchange site has a fixed negative charge and a mobile positive charge (in this case Hydrogen, expressed as H^+). When a positively charged ion, like sodium, encounters the cation resin bead, the sodium is attracted to the fixed negative charge (+ attracted to -) on the resin bead and sticks to it.



Ion Exchange Resins

Immediately the cation resin bead then gives up one of its Hydrogen (H^+) ions. This is the basis for “ion exchange”. You give up one ion for another.

A similar process takes place with the resin bead pictured on the right. The big circle on the right (with the yellow outline and OH^- circles in it) represents a strong base anion ion exchange bead in the Hydroxide form. Each small anion beads has millions of exchange sites (just like the cation does). However, on an anion bead, the fixed exchange sites are positive and the mobile charge is negative (in this case OH^- , or Hydroxyl). When a negatively charged ion, like chloride, encounters the anion resin bead, the chloride is attracted to the fixed negative charge on the resin bead and sticks to it. The anion bead then gives up one of its Hydroxyl (OH^-) ions.

When the Hydrogen (H^+) and Hydroxyl (OH^-) ions meet up, they form pure water, H_2O .

Although this process is fairly simple in concept, its application is complicated by variables in raw water composition, treated water quality requirements, resin selection and condition, chemical dosages and control system requirements.