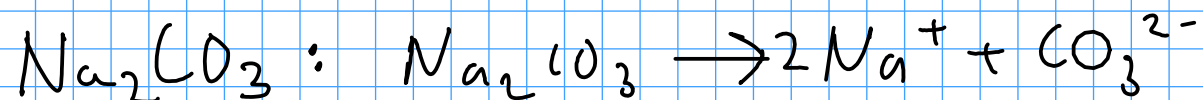


# SALTS

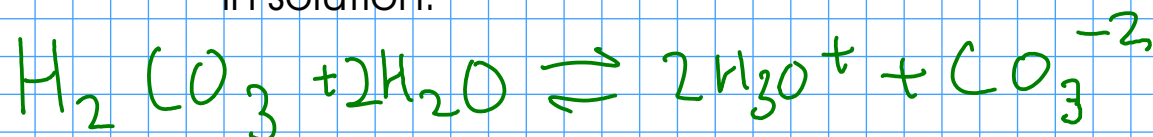
- Compounds that result from the reaction of an acid and a base.
- Salts are strong electrolytes (completely dissociate in water) IF SOLUBLE (not all salts dissolve appreciably).
- Most ionic compounds are considered salts (they can be made by some reaction between the appropriate acid and base)
- Salts have acidic and basic properties! The ions that form when salts are dissolved can be acidic, basic, or neutral.
  - Salts made from WEAK ACIDS tend to form BASIC solutions
  - Salts made from WEAK BASES tend to form ACIDIC solutions



Do any of these ions have acidic or basic properties?

$\text{Na}^+$ : neutral. Not a proton donor or a proton acceptor

$\text{CO}_3^{2-}$ : BASIC, since it can accept protons to form the weak acid CARBONIC ACID in solution.



ACID

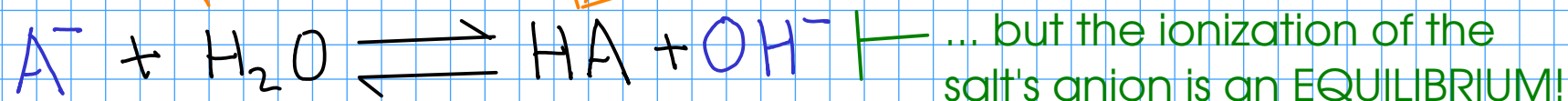
BASE

## SALT OF A WEAK ACID

ex:  $\text{NaC}_2\text{H}_3\text{O}_2$



For this reaction to occur, HA MUST be stable in water. In other words, a weak acid.



The anion is a BASE. It can accept a proton from water to form the weak (therefore stable as a molecule!) acid HA

$$K_b = \frac{[\text{HA}][\text{OH}^-]}{[\text{A}^-]} \quad \left| \text{--- This is the base ionization constant for } \text{A}^- \right.$$

Since  $\text{A}^-$  and HA are a conjugate pair, the ionization constants are related!

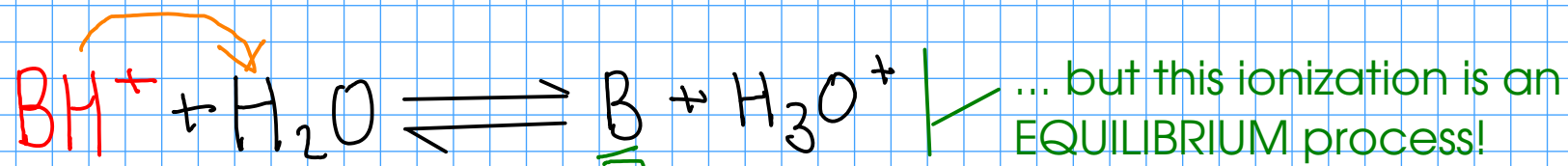
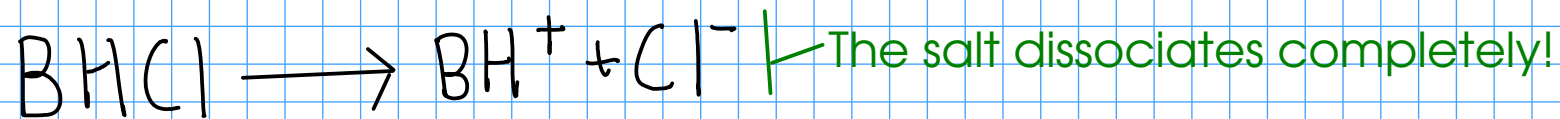
$$K_w = (K_{a,\text{HA}})(K_{b,\text{A}^-}) \quad \left| \text{---} \right.$$

$1.0 \times 10^{-14}$

You will generally not find both the  $K_a$  AND  $K_b$  for a conjugate pair in the literature, since one can be easily converted to the other!

ex:  $\text{NH}_4\text{Cl}$

## SALT OF A WEAK BASE



$$K_a = \frac{[\text{B}][\text{H}_3\text{O}^+]}{[\text{BH}^+]} \quad \left| \text{Acid ionization constant for } \text{BH}^+ \right.$$

$$K_w = (K_{a,\text{BH}^+})(K_{b,\text{B}})$$

$1.0 \times 10^{-14}$

Find the pH for salt solutions just like you would find pH for any other weak acid or weak base solutions. Only trick is to find out whether the salt is actually acidic or basic!