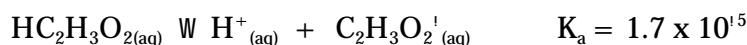


Classes of Weak Acids and Weak Bases

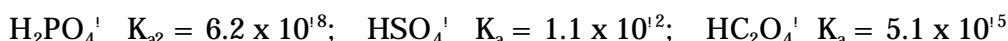
Weak acids generate a concentration of $H^+_{(aq)}$ less than that of the acid itself. Typically, weak acids ionize to only a few percent in water through an equilibrium. The weak acid ionization constant, K_a , allows the equilibrium to be quantified.

There are four classes of weak acids:

- (a) NEUTRAL PROTON DONORS -- the typical weak acids such as acetic acid, benzoic acid, hydrofluoric acid, etc.



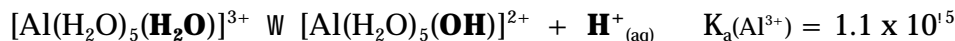
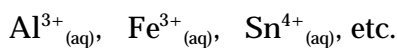
- (b) ACIDIC HYDROGEN-CONTAINING ANIONS OF POLYPROTIC ACIDS.



- (c) CONJUGATE ACIDS OF WEAK BASES -- most notably $NH_4^+_{(aq)}$

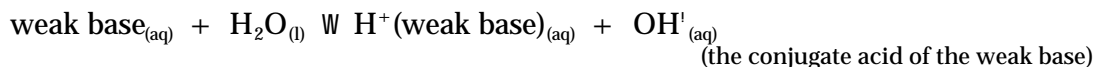


- (d) CATIONS WITH A HIGH POSITIVE CHARGE which hydrolyze in water (react with water).



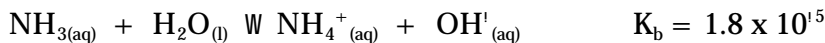
S))

Weak bases generate a concentration of $OH^{-1}_{(aq)}$ lower than that of the base itself. Weak bases generate the hydroxide ion by reaction with water (hydrolysis) which can be described as an equilibrium quantified through K_b .



There are two classes of weak bases:

- (a) NITROGEN BASES -- typically aqueous ammonia and organic compounds that contain one or more nitrogen atoms each holding a non-bonding pair of electrons such as: methyl amine, CH_3NH_2 , pyridine, C_5H_5N and hydrazine, N_2H_4 .



- (b) CONJUGATE BASES OF WEAK ACIDS -- the anions of weak acids such as, the acetate ion, $C_2H_3O_2^{-1}$; fluoride ion, F^- ; nitrite ion, NO_2^{-1} , etc. A solution of $NaC_2H_3O_2$ is basic because of the high affinity the acetate ion has for a proton.

