HCl HI $HClO_3$ HNO_3 H_2SO_4 $HClO_4$ HBr

The 7 strong acids!

Neutral

pH: 1 2 3 4 5 6 7 8 9 10 11 12 13 14

← Strong acids

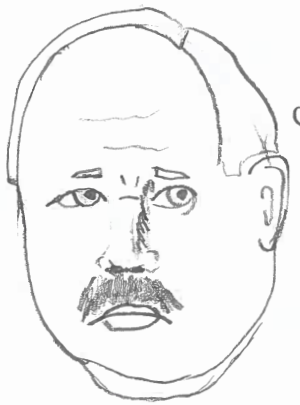
ACIDIC — weak acids / conj. acids of weak bases

Water

BASIC — weak bases / conj. bases of weak acids

Strong bases →

$[H^+]$ 10^{-1} 10^{-2} 10^{-3} 10^{-4} 10^{-5} 10^{-6} 10^{-7} 10^{-8} 10^{-9} 10^{-10} 10^{-11} 10^{-12} 10^{-13} 10^{-14}



Svante Arrhenius

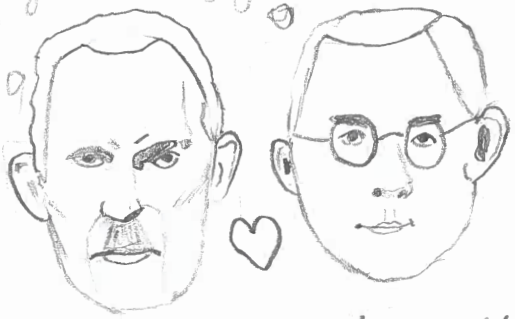
Acids always have H^+

Bases always have OH^-

Actually...

Acids donate H^+

Bases accept H^+



Brønsted & Lowry

Acid/base math!

Strong acid + strong base = (PH=7) neutral salt

F^- weak acid + any cation (+) = basic salt

H^+ weak acid + any anion (−) = acidic salt

F^- weak acid + NH_4^+ weak base = ? depends on strength

$K_a \times K_b = K_w$ or $pK_a + pK_b = pK_w$

Harper Lyrord

Aaron Adam

Heather believes in you!

Water is a Weak Acid AND a Weak Base.

This means it is amphiprotic. (both donates and takes proton)

$H_2O + H_2O \rightleftharpoons H_3O^+ + OH^-$

$H_2O + B \rightleftharpoons OH^- + BH^+$

↑ Here, water acts as a(n) ____

$HA + H_2O \rightleftharpoons H_3O^+ + A^-$

Here, water acts as a(n) ____

In pH, pOH, and pK, p stands for Power. It is calculated by taking the $-\log_{10}$ of the concentration of H^+ or OH^- (in moles/liter)

At equilibrium, normal water has 10^{-7} M of both H^+ and OH^-.

$K_w = [H^+][OH^-] = 10^{-14}$

So, when there is more H^+ than OH^-, the solution is acidic, more OH^- means basic.

by Harper Lyford, SHS '27

Harper Lyford