

Acids & Bases Notes #1

General Properties of Acids:

Sour taste

Examples: Vinegar (acetic acid), Citric Acid

General Properties of Bases:

Bitter taste

Feel slippery

Examples: Bleach (sodium hypochlorite), Drain Cleaner (sodium hydroxide)

Arrhenius Definitions of Acids and Bases:

Arrhenius Acids: when dissolved in water, these increase the concentration of H^{1+} ions

Arrhenius Bases: when dissolved in water, these increase the concentration of OH^{1-} ions

$HCl(g)$ bubbled into water produces $H^{1+}(aq)$ and $Cl^{1-}(aq)$

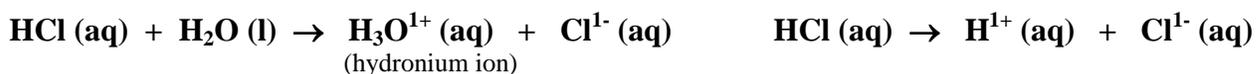
$NaOH(s)$ dissolved in water produces $Na^{1+}(aq)$ and $OH^{1-}(aq)$

**Arrhenius definitions work great for aqueous solutions
but the aqueous aspect limits the usefulness of this definition.**

Bronsted-Lowry Definitions of Acids and Bases

Bronsted-Lowry Acids: proton (H^{1+}) donors

Bronsted-Lowry Bases: proton acceptors



$H_3O^{1+}(aq)$ and $H^{1+}(aq)$ represent the same thing.

Many think the H_3O^{1+} is closer to reality, but the H^{1+} is more convenient.

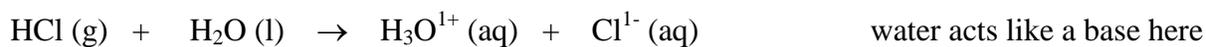
Bronsted-Lowry Definitions allow for non-aqueous chemical reactions



Acids and Bases always work together to transfer a proton. You cannot have an acid unless something else will accept the proton.

Some substances can act as an acid or as a base, depending on the reaction. These are called **amphoteric substances**.

Consider H₂O:



Conjugate Acid – Base Pairs (Conjugate means “joined as a pair”)



Polyprotic Acids:

Contain more than one ionizable hydrogen

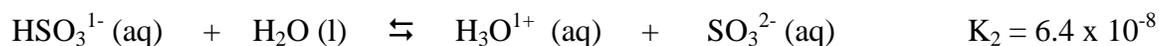
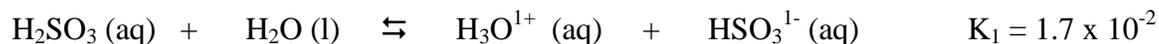
Examples:

H₂SO₃ has two protons that can be donated..... a “Diprotic Acid”

H₃PO₄ has three protons that can be donated..... a “Triprotic Acid”

Big Ideas:

Protons do not come off at the same time!



Always easier to remove the first proton than the second (or third). **K₁ > K₂**