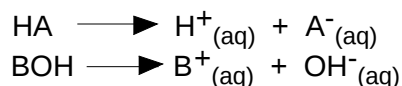


- You probably know from some previous chemistry course that there are strong and weak acids/bases. Here we'll take a look at the strong ones. It's easiest to remember the compounds that are considered strong acids or bases and then just know that if it's not strong it must be weak. If you remember the strong acids, you'll know the weak acids by default.

The assumption for **strong acids or bases** is that they **dissociate 100%** when you put them into water. For example:



This is just generic notation for acids and bases: A stands for the acid's anion, and B stands for the base's cation.

STRONG ACIDS

HCl	---->	Hydrochloric acid
HBr	---->	Hydrobromic acid
HI	---->	Hydriodic acid
HNO₃	---->	Nitric acid
HClO₃	---->	Perchloric acid
HClO₂	---->	Chloric acid
H₂SO₄	---->	Sulfuric acid

Sometimes you may need to compare acids to answer a question like "which of the following acids is stronger". You can use two general trends to address this type of question:

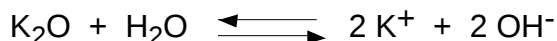
- For acid hydrides (HCl, HBr, etc.) the acidity increases within a group as the size of the central atom increases.
- Oxyacids (like H₂SO₄) can be written generally as:

$$\text{H}_m\text{XO}_n$$
 - The greater (n-m) the stronger the acid.
 - For the same n and m, the acid strength increases as the electronegativity of X increases.

STRONG BASES

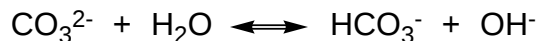
Metal Hydroxides: these are group IA and group IIA metals bonded to a hydroxyl group. For example, NaOH, Mg(OH)₂, etc.

Metal Oxides: these are group IA and group IIA metals bonded with oxygen. When you put them into water they attack the H₂O and break it up to form OH⁻.



Student Packet: 6.2: Strong Acids and Strong Bases: AssessMe questions

- 1) In the reaction:



the carbonate ion is acting as a(n):

- A) Arrhenius base B) Arrhenius acid
 C) Brønsted-Lowry base D) Brønsted-Lowry acid E) I'm clueless
- 2) Which of the following represents a Brønsted-Lowry conjugate acid-base pair?
- A) SO_3^{2-} and SO_2 B) CO_3^{2-} and CO
 C) H_3O^+ and H_2 D) NH_4^+ and NH_3 E) I'm clueless
- 3) What is the pH of a 1.0 M solution of $\text{Mg}(\text{OH})_2$?
- A) -3 B) 13.7 C) 14.3 D) None of these E) I'm clueless
- 4) If 1.00 L of 1.00 M HCl is mixed with 0.25 moles of solid NaOH (assume no volume change), what will be the pH of the resulting solution?
- A) 0.125 B) 0.60 C) 0.10 D) 1 E) I'm clueless
- 5) For the reaction: $4\text{NH}_{3(g)} + 5\text{O}_{2(g)} \rightleftharpoons 4\text{NO}_{(g)} + 6\text{H}_2\text{O}_{(g)}$
 ΔH is negative. Which of the following would cause the equilibrium to shift to the left?
- A) removing $\text{NO}_{(g)}$
 B) adding $\text{O}_{2(g)}$
 C) increasing the pressure by decreasing the volume of the container
 D) decreasing the temperature
 E) I'm clueless
- 6) What would be the effect of increasing the volume of the reaction vessel for the following equation? $2\text{A}_{(g)} \rightleftharpoons \text{B}_{(g)} + 3\text{C}_{(g)}$
- A) increase the equilibrium constant
 B) force the reaction to proceed to the right
 C) force the product ratio $[\text{C}]/[\text{B}]$ to be greater than 3
 D) both (A) and (B) are correct
 E) I'm clueless

Student Packet: 6.2: Strong Acids & Strong Bases: ShowMe questions

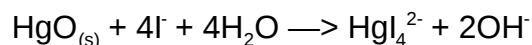
1) Calculate the $[H^+]$ of a solution prepared by diluting 100.0 mL of 0.0200 M $Ba(OH)_2$ with enough water to make 500.0 mL of solution.

2) A solution of HCl has density of 1.15 g/mL and is 30% by weight HCl.

a) What is the molarity of this solution?

b) What volume of this solution should be used to prepare 5.0 L of 0.20 M HCl by dilution with water?

c) In order to obtain a precise concentration, the 0.20 M HCl is standardized against pure HgO by titrating the OH^- produced according to the following reaction:



0.7147 grams of HgO required 31.67 mL of the HCl solution for titration. Based on this data, calculate the molarity of HCl to four significant figures.

3) What is the pH obtained by mixing 14.2 g $HClO_4$ and 12.4 g HCl in enough water to make 0.600 L of solution?

4) How many moles of HCl must be added to 1.50 L of 1.70 M KOH to obtain a pH of 2.00? (assume volume does not change)

Student Packet: 6.2: Strong Acids & Strong Bases: TestMe questions

- 1) What is the pH of a solution made by mixing 0.10 L of 6.0 M NaOH with 0.9 L of 1.0 M HCl?
- A) 5.2 B) 0.52 C) 7.0 D) 13.5 E) 0.74
- 2) What will be the pH of a solution made by dissolving 5.50 g $\text{Sr}(\text{OH})_2$ in enough water to make a 500.0 mL solution?
- A) 11.5 B) 0.742 C) 13.0 D) 13.3 E) 7.00
- 3) How many moles of pure NaOH must be used to prepare a 10.0 L solution with a pH of 13.00?
- A) 1.0 mol
B) 0.10 mol
C) 0.010 mol
D) 0.0010 mol
E) None of the above
- 4) How many moles of OH^- are present in 500.0 mL of a 0.40 M solution of HNO_3 ?
- A) 2.5×10^{-14} moles
B) 1.3×10^{-13} moles
C) 3.1×10^{-14} moles
D) 1.3×10^{-14} moles
E) None of the above
- 5) A 1.0 L solution initially has a pH of 4.00. How many grams of $\text{Ca}(\text{OH})_2$ must be added to the solution to obtain a new pH of 9.00? (ignore volume changes)
- A) 4.1×10^{-3} grams
B) 4.1×10^{-2} grams
C) 5.5×10^{-5} grams
D) 1.1×10^{-4} grams
E) 8.2×10^{-3} grams