
Reactions Lab II

Question: How can we use reactions and lab tests to determine the reactants and products of those reactions?

Safety: Avoid contact between solutions and solid with skin and eyes. Wear lab goggles at all times. Because of open flame, hair and dangling clothing should be pulled back. Take care not to touch hot glassware.

Part I: Lab tests

Your instructor will demonstrate how to do a splint test for the creation of O_2 , CO_2 , and H_2 .

O_2	re-lights
H_2	high pitched “pop”
CO_2	extinguish

Carry out each of these reactions and test with a glowing splint.

Reaction 1. $CaCO_3$ and HCl

Place a small amount of solid $CaCO_3$ in a test tube and add about 10 drops of HCl . Swirl until you observe a reaction taking place. Light and extinguish a splint, then place the glowing splint in the test tube. Record all observations.

Reaction 2. H_2O_2 decomposition.

Place about 10 drops of H_2O_2 solution in a test tube. Add a tiny amount of yeast (which acts as a catalyst – it does not participate in the reaction, just makes the reaction occur faster). Light and extinguish a splint, then place the glowing splint in the test tube. Record all observations.

Reaction 3. Mg and HCl

Obtain one or two magnesium metal turnings and place in a test tube. Add about 10 drops of hydrochloric acid. Swirl until you observe a reaction taking place. Light and extinguish a splint, then place the glowing splint in the test tube. Record all observations.

Reaction 4. $NaHCO_3$ and HCl

Place a small amount of solid $NaHCO_3$ in a test tube and add about 10 drops of HCl . Swirl until you observe a reaction taking place. Light and extinguish a splint, then place the glowing splint in the test tube. Record all observations.

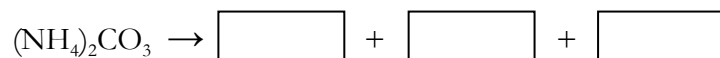
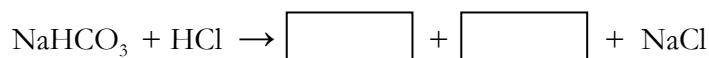
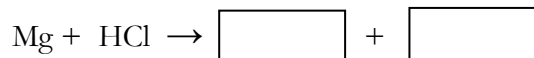
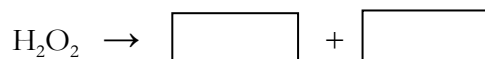
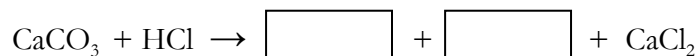
Reaction 5. Heating $(\text{NH}_4)_2\text{CO}_3$

Before you do this one, wet a piece of red litmus paper and place it over the ammonia (NH_3) beaker in the fume hood. Record what happens.

Obtain a small amount of ammonium carbonate and place it in a test tube. In the fume hood, heat the test tube gently over a Bunsen burner. Hold a piece of wetted red litmus paper. Watch the upper part of the test tube as well. Do NOT do a splint test.

Questions

1. Using the results of the splint test, determine the compounds that belong in the boxes below.



Think also about what the splint test reveals is NOT present!

2. Using the above reactions as guides, write the reaction equation for each of the following scenarios

(a) Solid magnesium carbonate is added to a solution of nitric acid

(b) Solid aluminum is added to a solution of hydrobromic acid

(c) Solid copper(II) carbonate is heated over a Bunsen burner

(d) Solid lithium carbonate is added to a solution of sulfuric acid

(e) Solid lithium bicarbonate (LiHCO_3) is placed in a solution of nitric acid

Part II: Qualitative Analysis

Qualitative analysis is a procedure that is often used to determine the identity of an unknown compound.

You will receive two sets of solutions, each solution is labeled A1, A2, etc.

Set A: Na_3PO_4 , AgNO_3 , $\text{Zn}(\text{NO}_3)_2$

Set B: HCl , KI , NaOH

React the two sets with one another according the table below to determine the identity of each compound.

Table for your notebook

	A1	A2	A3
B1			
B2			
B3			

Follow-up Questions

1. In your lab notebook determine the identity of each of the compounds in each unknown set. For each reaction that actually occurs, write the reaction equation.

2. Consider the following (completely different and made-up) set of reactions between two sets of unknowns. Determine the identity of each compound.

Set A: $\text{Pb}(\text{NO}_3)_2$ and Na_2CO_3

Set B: NaI and HI

	A1	A2
B1	No rxn	Yellow solid
B2	Bubbles	Yellow solid