CH 204 Fall 2007
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Experiment 3 Help Sheet

Discussion questions:

You should have a total of 11 different precipitation reactions from your observations in lab. Five of the reactions turned a cloudy white due to unavoidable trace contaminants in the chemicals, and not due to the intended reactants themselves. These are *false positives*. These five are not among the 11 reactions we are looking for.

$Na_2S + HCl$
$Na_2S + H_2SO_4$
$Na_2S + HNO_3$
$Na_2S + Ba(NO_3)_2$
$Ba(NO_3)_2 + NaOH$

For each of the 11 precipitates formed, you will need to write a *molecular equation* and a *net ionic equation*.

If you are not sure what a molecular equation and a net ionic equation look like, check the lecture slides for Experiment 3, available at

http://courses.cm.utexas.edu/banderson/ch204/ppts.html

For more on writing these equations, look at pages F63 – F66 in the green pages of the current CH 302 textbook.

Post-Lab

All of the post-lab problems can be answered using the same 10 reagents we used in lab. To make life easier for yourself and for your TA, limit your answers those 10 chemicals.

Question 1: We'll talk about this problem after we talk about problem 2.

Question 2: Imagine that you have two beakers sitting in front of you. One beaker holds an aqueous solution of the first chemical listed, and the other beaker is an aqueous solution of the second chemical. What you need to do for each of these problems is find ***one chemical*** that we used in lab that you could add to both beakers that would enable you to tell which beaker holds which of the two chemicals. The key here is to find something that will form a precipitate with one of the chemicals listed, but not with the other. For problem 2a, for example, you're going to be looking for a chemical that will

form a precipitate with KOH, but not with KNO_3. Since the potassium is always soluble, and so are nitrates, you're looking for something that will precipitate with OH^-. Use the solubility chart in Appendix 2 of the lab manual to find suitable answers for these.

Hint: The chemical you add has to be a *compound*. You can't just add Ba^{2+} to a solution, but you can add $Ba(NO_3)_2$. To ensure that your counter ion doesn't also precipitate out something in the beaker, always use a Group I metal or an anion like nitrate that you know will always be soluble (in this example NO_3^- is the counter ion).

Back to Question 1: This one is just like the problems in Question 2, but instead of having only two unlabelled beakers in front of you, there are five. You have to add one reagent from the 10 we used in lab that will enable you to identify one of the five reagents. Then you have to find another reagent from the lab that will enable you to identify one of the remaining four bottles. Keep doing this until there is only one bottle left. What you are looking for in each case is a reagent that will either precipitate with *only one* of the unknowns, or a reagent that will precipitate with all of them *except* one.

Question 3: Look at pages F30 – F33 of the current CH 302 textbook if you don't know how to come up with the formulas for these compounds. Each of these compounds is a precipitate. For each one what you need to do is write a net ionic equation for the reaction that formed the precipitate, and then add counter ions to the two reagents and create a molecular equation for the reaction. If you're not sure how to do this, look at the lecture slides for Experiment 3 on the class web page.

http://courses.cm.utexas.edu/banderson/ch204ppts.html