Laboratory

CHEMISTRY 1361 End-Of-Term Evaluation

Double Displacement (Metathesis reactions)

Double displacement reactions are of the type:

\[ AB + CD \rightarrow AD + CB \]

In the reactions you will study, each of the compounds will form ions in solution and the ions will then recombine to form new compounds or remain in solution. In this end-of-term evaluation you will develop a research design (methodology, a plan), perform a series of reactions, and observe results, testing two unknown solutions which each a contain soluble compound. Each student will design a series of experiments using their concept of solubility, dissociation into ions, and ionic compounds to test their own vials containing two soluble salts. If you see no visible signs of reaction, such as a temperature change (temperature change probably is not a useful indicator for you since you won’t be able to monitor it), a precipitate being formed, or a gas being released, it may be that the compounds have simply dissolved in solution without recombining. If you feel this is the case, simply write "no reaction", however you must justify this conclusion.

There will be no lab partners. Each student will arrive at laboratory at their assigned lab time with a plan of experimental design or approach (procedures) and a data table. In lab you will receive a two vials each containing one soluble salt. There will be available a set of test reagents that will include the same reagents as used in the laboratory exercise involving double displacement reactions. The test reagents include barium chloride, calcium chloride, copper (II) nitrate, lead (II) nitrate, magnesium nitrate, strontium nitrate, sodium chloride, sodium carbonate, sodium chromate, sodium iodide, sodium sulfate, hydrochloric acid, potassium hydroxide, and sodium periodate. The purpose is to identify the two soluble compounds in your assigned vials by using the available test reagents.

You must arrive in lab with a prepared procedure (experimental plan) and a prepared data table. You will not be able to use the laboratory manual. However, you may refer to the “metathesis lab activity” in the lab manual as you prepare for this exercise. You will also be observed for technique, i.e. cleanliness, and safety, i.e. wearing goggles.
Here are a couple of notes related to the CHEM 1361 lab final coming up on Wednesday, May 4, from 12:30 – 2:30.

1. I have split you into two groups for purposes of scheduling. Each student will work individually during the time period indicated below. Be on time or you will not be allowed to start the final.

<table>
<thead>
<tr>
<th>Time</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 – 1:30</td>
<td>Toni Alvarado, Karen Baumgartner, Karli Boothe, Alan Chavez, Namignan Dosso, Jennifer Hiebler</td>
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<tr>
<td>1:30 – 2:30</td>
<td>Sara Collins, Jennifer Gonce, Mashawn Johnson, Nneoma Onyeizu, Nikita Patel, Jordan Mills</td>
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</tbody>
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2. The description of the final may be found on the back of this page. I thought I might add a few notes that may be helpful.
   a. Don’t be overwhelmed. Look at Experiment 8, Metathesis Reactions, particularly the table on page 69.
   b. You will be provided with all the test reagents listed on that page (also listed in the description of the final exam).
   c. You will be provided with two unknown salt solutions. These two unknown salt solutions are two of the same solutions that are given to you as test reagents. For example, NaI could be one of your salt solutions, but NaBr couldn’t be because it isn’t in the list of reagents.
   d. As you create your plan of attack, consider the observations you made in Experiment 8 – precipitates, gas evolution, etc. to look for key experiments to perform.

3. The lab final counts as 80 points toward the 790 possible for the semester – a little less than 10%. The grading will be based on:
   a. The procedure you bring with you to class. This will include the thoroughness, accuracy, and efficiency. If you do not bring a procedure you will not be allowed to do the final exam. (30 points)
   b. Your technique including wearing goggles at ALL times in the lab. (5 points)
   c. The utility of your data table and the clarity of the information contained in it after the experiment. (25 points)
   d. Accurate identification of the unknown solutions. Make sure you clearly state your conclusions as to the identity of the unknowns. (20 points)