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Experimental Determination of Precipitate Identity

During lab you will investigate precipitate reactions and identify the products or precipitation reactions. A question you will address is "What is the precipitate?"

In order to appropriately answer such a question you need to know how to:

- Use the CRC Handbook to look up the properties of substances.
- Design reference blank tests to experimentally identify the spectator and reactant species in a reaction.

The *CRC Handbook of Chemistry and Physics* is the world's most popular scientific reference book. It features tables and reference sections on everything including many properties of chemicals such as solubility, color, melting point.

Below is a video guide on how to look up data on chemicals. The video below demonstrates how to look up the solubility of a salt.

[http://www.youtube.com/watch?v=l0nzcGdXhr4&feature=player_embedded]

- Starting from the University of Michigan home page:
 1. Click on the Mirlyn catalog link under quick links.
 2. Click on Mlibrary home.
 3. Type in CRC handbook in search bar (have only the database option selected).
 4. From the results, select the CRC handbook of Chemistry and Physics.
 5. Expand Section 4: Properties of the Elements and Inorganic Compounds
 6. Select Physical Constants of Inorganic Compounds.
 7. There are many abbreviations used in the text, take a moment to read over and familiarize yourself with the terms.
 8. Type in the salt name you wish to search in the "find" box.

Reference Blank Test

- An experimental test mixture that is designed to identify reactants and specators (non-reactants) is called a reference blank test. A reference blank test:
 - Omits a species from the reaction.
 - Substitutes a known spectator species for the omitted species.

The video below describes an analysis of the precipitation reaction between $\text{HgCl}_2(\text{aq})$ and $\text{KI}(\text{aq})$ using reference blank tests. A reference blank test is demonstrated and the conclusion is stated. Watch carefully as the second reference blank test is demonstrated. You will be asked to answer the following question at the conclusion of the test demonstration: What do you know about the tested species in the precipitation reaction based on the outcome of the second reference blank test?

[http://www.youtube.com/watch?v=ReRcB8-J5mM&feature=player_embedded]

Test Yourself.

What do you know about the precipitation reaction based on the outcome of the reference blank test where NO_3^- was substituted for I^- ?

If you wish to further check your answer and reasoning watch the video below. Also observe the outcome of a second reference blank test testing another ion!

[http://www.youtube.com/watch?v=HRy0Xylz7Sc&feature=player_embedded]

In the second reference blank test done in the video, what conclusion can be made based on the outcome where NO_3^- was substituted for Cl^- ?

Reference blanks tests are an experimental method used to identify reactants and spectators in any type of reaction.

[http://www.youtube.com/watch?v=YJ57ZZ2vLNM&feature=player_embedded]

Based strictly on the above tests can you indicate that Hg^{2+} is a reactant in the precipitation reaction?

F.Y.I.

You need to keep some important things in mind when creating a reference blank test!

[http://www.youtube.com/watch?v=OmDiwa0MrUs&feature=player_embedded]

- Just because you made substitutions of ions, doesn't necessary mean your reference blank test is valid.
 - *Always* remember: a reference blank test results either gives you a reaction that gives you the exact *same* product or there is *no* reaction in order for it to be a valid test that you can use to make conclusions about reactants and spectators.
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Let's look at an exam question that has to do with reference blank tests.

[http://www.youtube.com/watch?v=5HWxT_qh6u8&feature=player_embedded]