



Analysis of Reactions, E 6



E 6

- Pre-lab report (p.159) due at the start of lab
- Single session two hour lab experiment.
- Teams analyze 3 assigned reactions.
 - one reaction may or may not be a non-reaction.
- Team report is due at the end of lab.
 - report = write up of the analysis of the 3 reactions.
- Teams present one of the 3 reactions in discussion during the first hour of the next session.



Analysis of a Non - Reaction

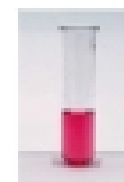
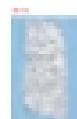
Record your qualitative observations of individual reagents and the reagent mixture.

- Conduct a minimum of two quantitative tests and experiments to confirm that no reaction occurred.
- Tests should demonstrate that no change in reactant properties has occurred.
- **Do NOT** conduct reference blank tests!



Analysis of a non - reaction

Example 1:



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Q. What tests or measurements could you conduct to confirm that "no reaction" has occurred?

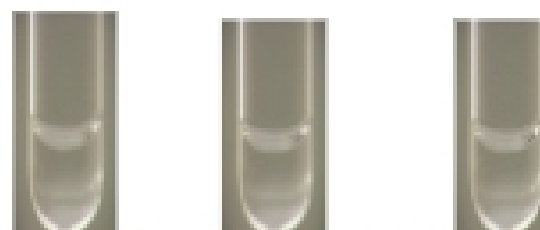
Analysis of $\text{Ag}(s) + \text{Co}(\text{NO}_3)_2(aq) \rightarrow$

Some example of tests or measurements:

1. Show that the pH of $\text{Co}(\text{NO}_3)_2(aq)$ doesn't change upon addition of silver metal. (Use a pH paper or pH meter to monitor pH)
2. Show that the concentration of $\text{Co}(\text{NO}_3)_2(aq)$ doesn't change upon addition of silver metal. (Use a spectrophotometer to measure absorbance and show no delta in absorbance).
3. Show that the mass of Ag remains constant (Use a balance)
4. Show that the temperature of $\text{Co}(\text{NO}_3)_2(aq)$ doesn't change (Use a thermometer)
5. Show that the $\text{Co}(\text{NO}_3)_2(aq)$ does not contain silver ions (Add a precipitating agent such as NaCl and get no silver chloride ppt)
6. Add $\text{Co}(s)$ to $\text{AgNO}_3(aq)$ and get a reaction producing $\text{Ag}(s)$ and $\text{Co}(\text{NO}_3)_2(aq)$.

Analysis of A Non-Reaction

Example 2



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Analysis of A Non-Reaction

Example 2



Q. Circle any test that can support "no reaction":

- A) The temperature of the original solutions and reaction mixture shows no Δt° .
- B) $\text{KCl}(aq) + \text{KI}(aq) + \text{hexane} \rightarrow$ clear, colorless phases
- C) $\text{SnCl}_2(aq) + \text{I}_2(aq) + \text{hexane} \rightarrow$ clear, colorless phases.

Answer: A) and C)

$\text{SnCl}_4 + \text{KI} \rightarrow$ no reaction?

Q. Why does Test C ($\text{SnCl}_2 + \text{I}_2 \rightarrow$ colorless hexane phase) support "no reaction"?

Test C

Hexane is colorless and therefore reaction occurred
net rxn: $\text{Sn}^{2+} + \text{I}_2 \rightarrow \text{Sn}^{4+} + 2 \text{I}^-$

Note: Rxn being studied: $\text{Sn}^{4+} + \text{Cl}^- + \text{K}^+ + \text{I}^- \rightarrow ?$

If $\text{Sn}^{4+} + \text{I}^-$ react the products = $\text{Sn}^{2+} + \text{I}_2$

$\text{Sn}^{4+} + \text{I}^-$ are the products of a spontaneous redox rxn and thus do not react.



Reaction?

☞ Record your qualitative observations of individual reagents and the reagent mixture.

1) Determine the identity of reactants/spectators.

- Record hypothesis, tests, observations, and conclusions.

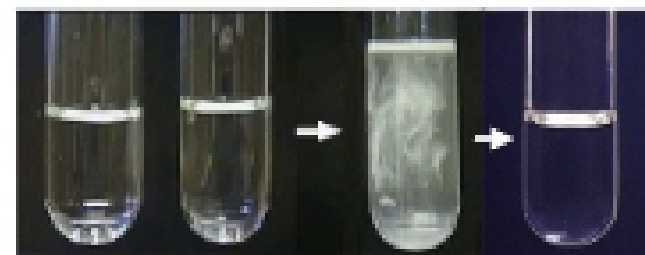


Analysis of Reactions: Reaction 1

Reaction 1:

Add 20mL 0.10M SnCl_2 to 2.0mL of 0.10M $\text{Hg}(\text{NO}_3)_2$

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$\text{SnCl}_2 + \text{Hg}(\text{NO}_3)_2 \rightarrow \text{white ppt.} \rightarrow \text{gray-bl ppt.}$

Identify Reactant and Spectator Species.

Reaction:

Add 20mL 0.10M SnCl_2 to 2.0mL of 0.10M $\text{Hg}(\text{NO}_3)_2$

Hypothesis: " Hg^{2+} is a reactant".

Test 1:

20mL 0.10M SnCl_2 to 2.0mL of 0.10M $\text{NaNO}_3 \rightarrow$

Q. Is test 1 an appropriate test of the hypothesis?

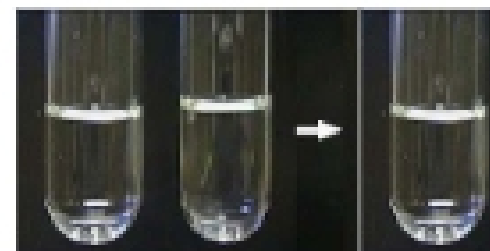
Yes

Identify Reactant and Spectator Species.

Reaction 1:

Add 20 mL 0.10 M SnCl_2 to 2.0 mL of 0.10M $\text{Hg}(\text{NO}_3)_2$

DEMO



Test 1: $\text{SnCl}_2 + \text{Na}(\text{NO}_3) \rightarrow$ **No reaction**