

SAMPLE PROBLEM B

For more help, go to the *Math Tutor* at the end of Chapter 14.

Identify the precipitate that forms when aqueous solutions of zinc nitrate and ammonium sulfide are combined. Write the equation for the possible double-displacement reaction. Then write the formula equation, overall ionic equation, and net ionic equation for the reaction.

SOLUTION**1 ANALYZE**

Given: identity of reactants: zinc nitrate and ammonium sulfide
reaction medium: aqueous solution

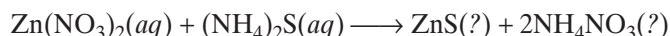
Unknown: a. equation for the possible double-displacement reaction b. identity of the precipitate c. formula equation d. overall ionic equation e. net ionic equation

2 PLAN

Write the possible double-displacement reaction between $\text{Zn}(\text{NO}_3)_2$ and $(\text{NH}_4)_2\text{S}$. Use **Table 1** to determine if any of the products are insoluble and will precipitate. Write a formula equation and an overall ionic equation, and then cancel the spectator ions to produce a net ionic equation.

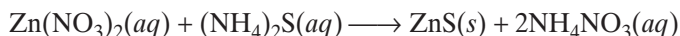
3 COMPUTE

a. The equation for the possible double-displacement reaction is as follows.

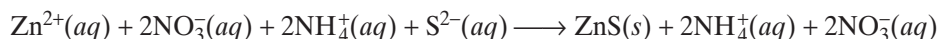


b. **Table 1** reveals that zinc sulfide is not a soluble sulfide and is therefore a precipitate. Ammonium nitrate is soluble according to the table.

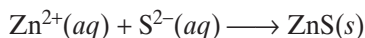
c. The formula equation is as follows.



d. The overall ionic equation is as follows.



e. The ammonium and nitrate ions appear on both sides of the equation as spectator ions. The net ionic equation is as follows.

**PRACTICE**

Answers in Appendix E

1. Will a precipitate form if solutions of potassium sulfate and barium nitrate are combined? If so, write the net ionic equation for the reaction.
2. Will a precipitate form if solutions of potassium nitrate and magnesium sulfate are combined? If so, write the net ionic equation for the reaction.
3. Will a precipitate form if solutions of barium chloride and sodium sulfate are combined? If so, identify the spectator ions and write the net ionic equation.
4. Write the net ionic equation for the precipitation of nickel(II) sulfide.

extension

Go to **go.hrw.com** for more practice problems that ask you to identify precipitates that form when solutions are combined.



Keyword: HC61ONX