

## EXERCISE 10

### Double Replacement and Single Replacement Reactions

#### OBJECTIVE:

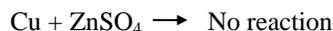
1. To study the double and single replacement reactions.
2. To write net ionic reactions.
3. To identify oxidation reduction reactions.

The single displacement reaction takes place when one element replaces another element from a compound.

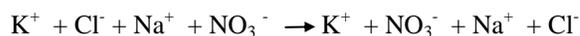


Zn replaced Cu from  $\text{CuSO}_4$  solution. Zn is more active than Cu.

The reverse of this reaction will not take place:



The double displacement reaction takes place when water solution of two ionic compounds are added. The evidence of a chemical reaction may be due to the evolution of heat, formation of a precipitate, evolution of gas, and/or change in color of reactants. If the addition of two ionic reactants result in the formation of two ionic products, a reaction has not taken place.



It is observed from the ionic reaction that the solution contains the same four ions.



Here, the addition of KCl to  $\text{AgNO}_3$  forms a precipitate. The precipitate is an evidence of a chemical reaction. Note that  $\text{K}^+$  and  $\text{NO}_3^-$  are found on either side of the reaction. These ions are called spectator ions. If spectator ions are deleted from the reaction, the result is known as the net ionic reaction.

## Equipment

Test Tubes

## Procedure

Place five test tubes in a rack. Number or code each test tube. Add the following and record your observation.

First test tube	Zn + 4 ml MgSO <sub>4</sub>
Second test tube	Zn + 4 ml H <sub>2</sub> SO <sub>4</sub>
Third test tube	Cu + 4 ml AgNO <sub>3</sub>
Fourth test tube	Cu + 4 ml H <sub>2</sub> SO <sub>4</sub>
Fifth test tube	Pb + 4 ml H <sub>2</sub> SO <sub>4</sub>

Place another eight test tubes in the rack. Number each test tube. Add the following reagents and record your observations

First test tube	2 ml of NaCl + 2 ml of KNO <sub>3</sub>
Second test tube	2 ml of NaCl + 2 ml of AgNO <sub>3</sub>
Third test tube	2 ml of BaCl <sub>2</sub> + 2 ml of H <sub>2</sub> SO <sub>4</sub>
Fourth test tube	2 ml of CuSO <sub>4</sub> + 2 ml of Zn(NO <sub>3</sub> ) <sub>2</sub>
Fifth test tube	2 ml of Mg(NO <sub>3</sub> ) <sub>2</sub> + 2 ml of NH <sub>4</sub> OH
Sixth test tube	2 ml of Mg(NO <sub>3</sub> ) <sub>2</sub> + 2 ml of NaOH
Seventh test tube	2 ml of Na <sub>2</sub> CO <sub>3</sub> + 2 ml of HCl
Eighth test tube	2 ml of NaHCO <sub>3</sub> + 2 ml of HCl

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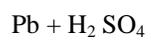
### ANSWER SHEET

NAME \_\_\_\_\_ SECTION \_\_\_\_\_ DATE \_\_\_\_\_

Complete and Balance

Reaction





Which of the above elements is the most active? \_\_\_\_\_

Which of the above elements is least active? \_\_\_\_\_

Use the activity series to check your answer. Write the ionic and net ionic reaction if applicable. Indicate what was oxidized, was reduced, the oxidizing agent and the reducing agent where applicable.



## EXERCISE 10

### ANSWER SHEET PART 2



