

# REACTION BETWEEN IONS IN AQUEOUS SOLUTION

Ionic compounds (salts and bases) dissolve in water by a process known as **dissociation**. In this process, the crystal lattice of the solid breaks down and free ions move throughout the solution. The **total number of positive charges is equal to the total number of negative charges** in an ionic solution.

If aqueous (water) solutions of two different ionic compounds are mixed, one of two things will occur. If all of the ions remain free, **nothing** will happen. That is, the appearance of the mixture of solutions will remain **clear, or transparent**. However, if two oppositely charged ions are attracted to one another strongly enough, they may bond together to form an ionic compound that is **insoluble** in water. In such cases, a **precipitate** will form.

In this experiment, aqueous solutions of several different ionic compounds will be used. Different combinations of solutions will be mixed and the results observed. For those mixtures in which precipitates form, equations will be written for the **NET IONIC** reactions

Note the following solubility statements:

- 1) All nitrates are soluble
- 2) All lithium, sodium, potassium and ammonium salts are soluble

## PROCEDURE

- 1) Obtain either solution Set A or B

SOLUTION SET A	SOLUTION SET B
0.10 M AgNO <sub>3</sub>	0.10 M Fe(NO <sub>3</sub> ) <sub>3</sub>
0.10 M BaCl <sub>2</sub>	0.10 M NaOH
0.10 M Na <sub>2</sub> CO <sub>3</sub>	0.10 M CuBr <sub>2</sub>
0.10 M (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	0.10 M Na <sub>2</sub> CO <sub>3</sub>
0.10 M Ca(NO <sub>3</sub> ) <sub>2</sub>	0.10 M Ba(NO <sub>3</sub> ) <sub>2</sub>

- 2) Obtain a square of thin plastic and add a drop of a second solution to it. Be sure that the dropper from the second solution does not touch the first drop or contamination will result. Continue until you have tried all the different pairs of solutions from the six provided.

**Note** It will help if you set out the solutions on your plastic in a regular array as shown in the following tables.

SOLUTION SET A

	AgNO <sub>3</sub>	BaCl <sub>2</sub>	Na <sub>2</sub> CO <sub>3</sub>	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	Ca(NO <sub>3</sub> ) <sub>2</sub>
BaCl <sub>2</sub>					
Na <sub>2</sub> CO <sub>3</sub>					
(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>					
Ca(NO <sub>3</sub> ) <sub>2</sub>					

SOLUTION SET B

	Fe(NO <sub>3</sub> ) <sub>3</sub> FeCl <sub>3</sub>	NaOH	CuBr <sub>2</sub>	Na <sub>2</sub> CO <sub>3</sub>
NaOH				
CuBr <sub>2</sub>				
Na <sub>2</sub> CO <sub>3</sub>				
Ba(NO <sub>3</sub> ) <sub>2</sub>				

- 3) Note which combination of solutions gave either a cloudy appearance or visible specks of precipitate. (indication of a reaction!)
- 4) Repeat the procedure for the other set of solutions