



Solubility and Precipitation

Topical Unit of Instruction: Solutions and Solubility

Introduction

This microscale lab uses extremely small quantities of dilute solutions of mostly non-toxic chemicals. It generates two drops for each of the fifteen combinations, only 30 drops of waste in all!

Time

30 minutes for data collection

50 minutes for analysis and conclusions

Objectives

1. To observe precipitate formation in double replacement reactions.
2. To predict products of double replacement reactions using a solubility chart and to write balanced equations for those reactions.

Preparation

1. To make 100 mL of each solution, put ~50 mL distilled H₂O in each of six 100 mL volumetric flasks. Add the solutes as follows:

AgNO₃ : 1.70 g

NaNO₃ : 0.85 g

Na₃PO₄ • 12 H₂O : 3.80 g

K₂CO₃ : 1.38 g

FeCl₃ • 6H₂O : 2.70 g

CuSO₄ • 5H₂O : 2.50 g

Swirl until dissolved and dilute to volume with distilled H₂O.

2. Dispense the solutions in 4 sets of labeled Beral pipets.

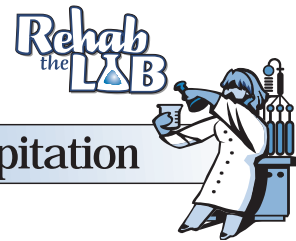
Materials

(For a class of 32 students working in pairs)

- 10 mL of each of the following 0.1 M solutions: AgNO₃, NaNO₃, Na₃PO₄, K₂CO₃, FeCl₃, and CuSO₄.
- 16 well plates
- 24 Beral pipets

Typical Results

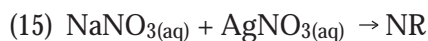
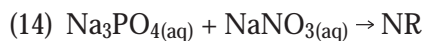
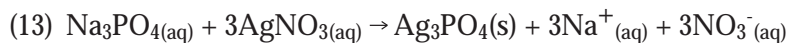
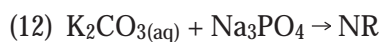
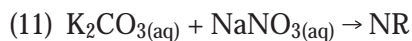
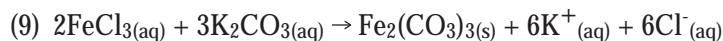
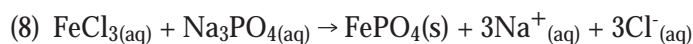
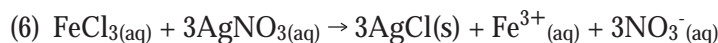
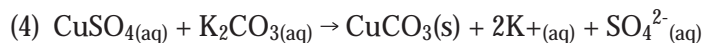
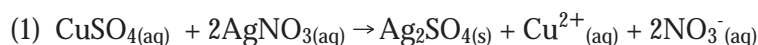
	AgNO ₃	NaNO ₃	Na ₃ PO ₄	K ₂ CO ₃	FeCl ₃
CuSO ₄	White PPT (1)	NR (2)	Turquoise PPT (3)	Turquoise PPT (4)	Yellow PPT (5)
FeCl ₃	White PPT (6)	NR (7)	White PPT (8)	Orange PPT (9)	
K ₂ CO ₃	White PPT (10)	NR (11)	NR (12)		
Na ₃ PO ₄	Yellow PPT (13)	NR (14)			
NaNO ₃	NR (15)				



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Analysis and Conclusions

1.



2.

(A) NO_3^-

(B) Na^+ and K^+

(C) SO_4^{2-} , CO_3^{2-} , and PO_4^{3-}

(D) Ag^+

Disposal

Wash well plates down sink with excess H_2O . Save labeled pipets from year to year.

Hint

Although 96 well plates work fine, students find it easier to make observations in 24 well plates.

