3. 5. Using Solubility Table and Precipitation to Identify Ions

a) Where would a chemist want to do this?

We might have a solution containing unknown ions and wish to determine what ions are present.

b) What is the process used to identify ions?

i) Lets pretend we suspect a solution contains Ba^{+2} or Cu^{+}.

ii) Search the Solubility Table for the anions that can precipitate (ppt.) one or both cations.

We quickly find that SO_4^{-2}, OH^{-}, PO_4^{-3}, CO_3^{-2}, SO_3^{-2} will precipitate Ba^{+2}.

We also find that Cl^{-}, I^{-}, Br^{-}, S^{-2}, OH^{-}, PO_4^{-3}, CO_3^{-2}, SO_3^{-2} will precipitate Cu^{+}

3. 5Using Solubility Table and Precipitation to Identify Ions

iii) Make a table to organize your ions:

	Cl^-, I^-, Br^-	SO_4^{-2}	S^{-2}	OH^-	PO_4^{-3}, CO_3^{-2}, SO_3^{-2}
Cu^+					
Ba^{+2}					

3. 5Using Solubility Table and Precipitation to Identify Ions

iii) Make a table to organize your ions:

	Cl^-, I^-, Br^-	SO_4^{-2}	S^{-2}	OH^-	PO_4^{-3}, CO_3^{-2}, SO_3^{-2}
Cu^+	ppt				
Ba^{+2}	-				

Can identify Cu^+

3. 5. Using Solubility Table and Precipitation to Identify Ions

iii) Make a table to organize your ions:

	Cl^-, I^-, Br^-	SO_4^{-2}	S^{-2}	OH^-	PO_4^{-3}, CO_3^{-2}, SO_3^{-2}
Cu^+	ppt	-			
Ba^{+2}	-	ppt			

Can identify Cu^+

Can identify Cu^+

3. 5Using Solubility Table and Precipitation to Identify Ions

iii) Make a table to organize your ions:

	Cl^-, I^-, Br^-	SO_4^{-2}	S^{-2}	OH^-	PO_4^{-3}, CO_3^{-2}, SO_3^{-2}
Cu^+	ppt	-	ppt		
Ba^{+2}	-	ppt	-		

Can identify Cu^+

Can identify Ba^{+2}

Can identify Cu^+

3. 5. Using Solubility Table and Precipitation to Identify Ions

iii) Make a table to organize your ions:

	Cl^-, I^-, Br^-	SO_4^{-2}	S^{-2}	OH^-	PO_4^{-3}, CO_3^{-2}, SO_3^{-2}
Cu^+	ppt	-	ppt	ppt	ppt
Ba^{+2}	-	ppt	-	ppt	ppt

Can identify Cu^+

Can identify Ba^{+2}

Can identify Cu^+

3. 5. Using Solubility Table and Precipitation to Identify Ions

iii) Make a table to organize your ions:

	Cl^-, I^-, Br^-	SO_4^{-2}	S^{-2}	OH^-	PO_4^{-3}, CO_3^{-2}, SO_3^{-2}
Cu^+	ppt	-	ppt	ppt	ppt
Ba^{+2}	-	ppt	-	ppt	ppt

Can identify Cu^+

Can identify Ba^{+2}

Can identify Cu^+

iv) Conclude that if we add Cl^- (or I^-, Br^-) or S^{-2}, and a ppt. forms, Cu^+ is present. If we add SO_4^{-2} and a ppt. forms, Ba^{+2} is present.

3. 5. Using Solubility Table and Precipitation to Identify Ions

c) What would be the experimental procedure used to identify the ions?

Step 1: To 1ml unknown solution, add a few drops of 1M HCl. (or sulphide salt!)

If a ppt. forms, **Cu^{+} is present**. Filter and discard ppt. and proceed to Step 2 with the remaining solution.

If a ppt. does not form. **Cu^{+} is not present**. Proceed to Step 2.

Step 2: To the solution from Step 1, add a few drops of 1M Na_2SO_4.

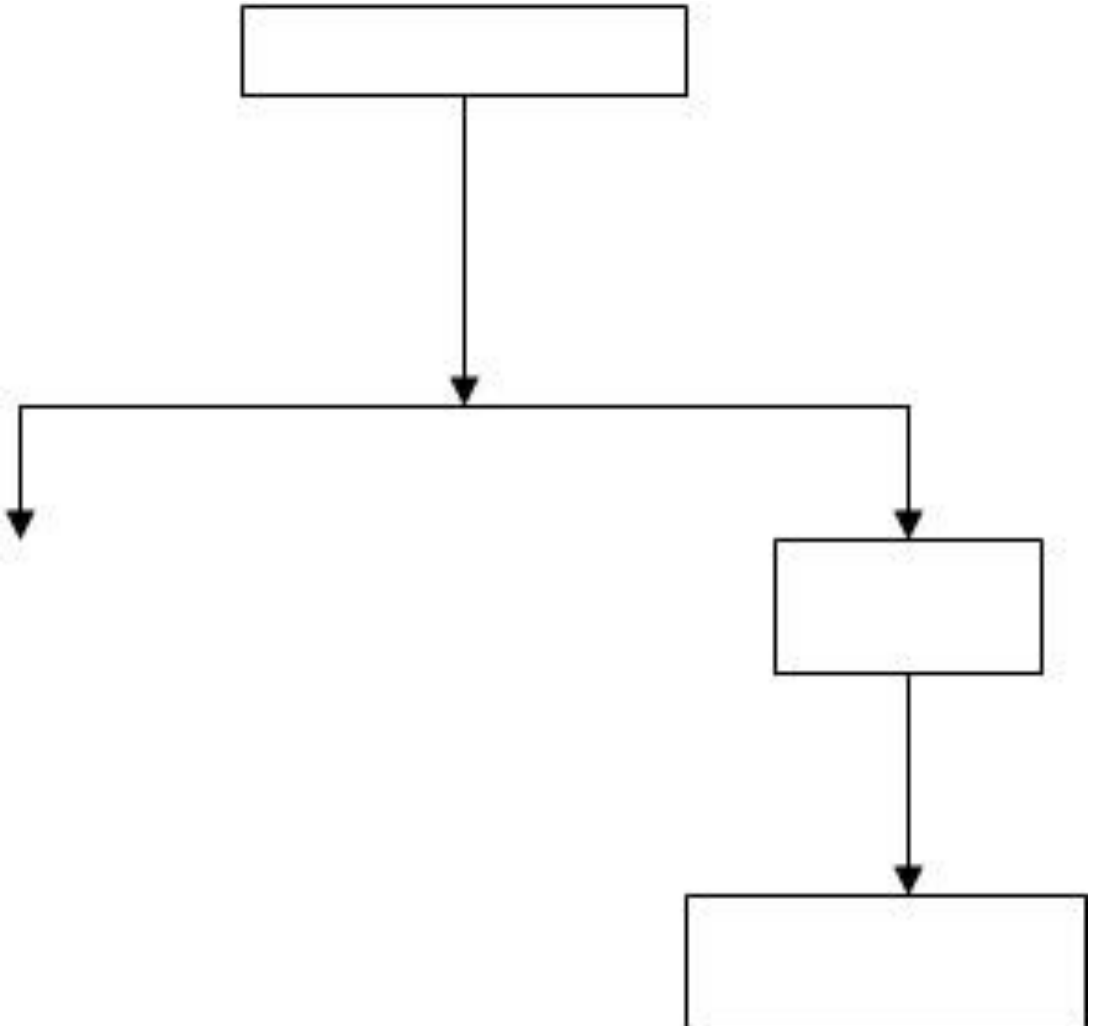
If a ppt. forms, **Ba^{+2} is present**.

If a ppt. does not form. **Ba^{+2} is not present.**

3. 5. Using Solubility Table and Precipitation to Identify Ions

d) Flow Charts Rule!

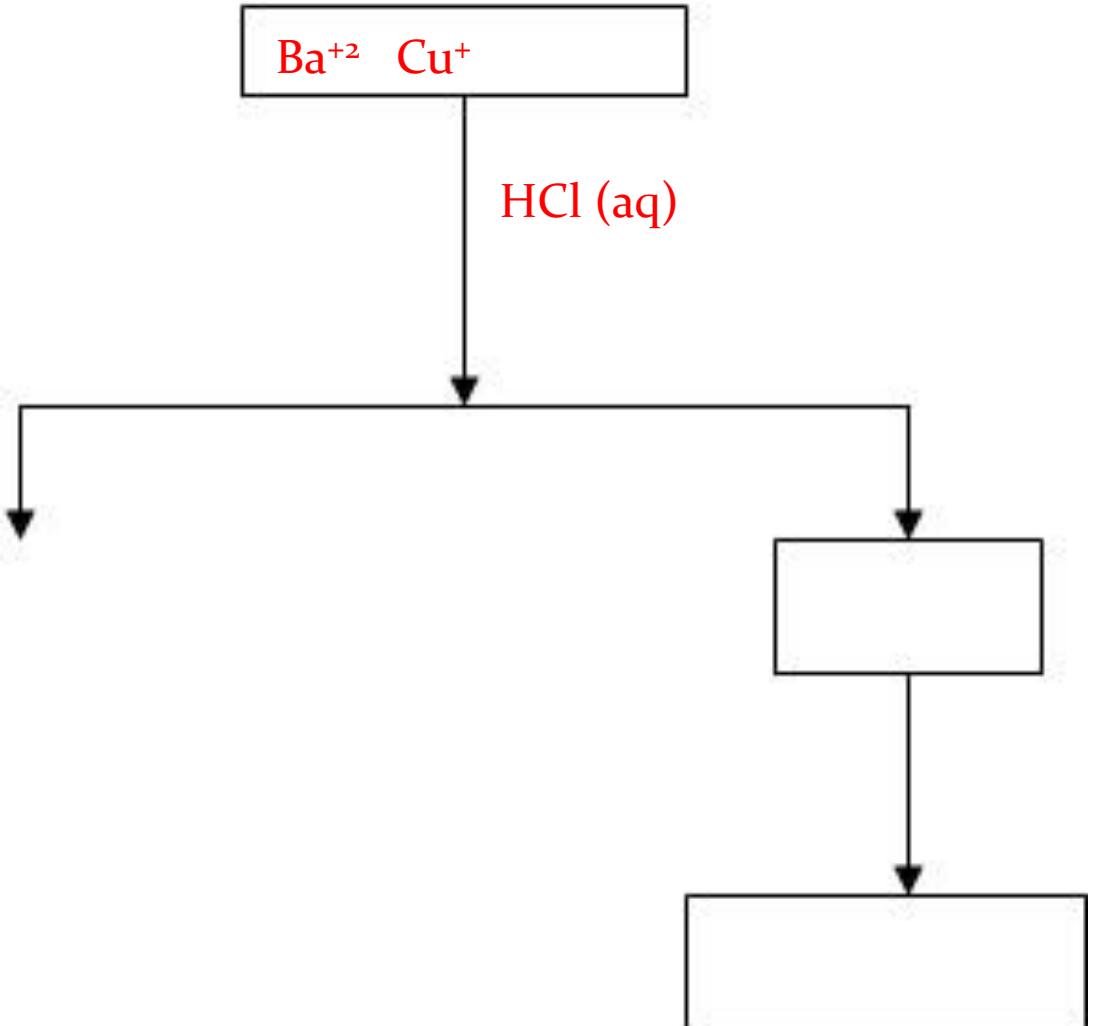
Use flow charts to help you organize the proper experimental procedure!



3. 5. Using Solubility Table and Precipitation to Identify Ions

d) Flow Charts Rule!

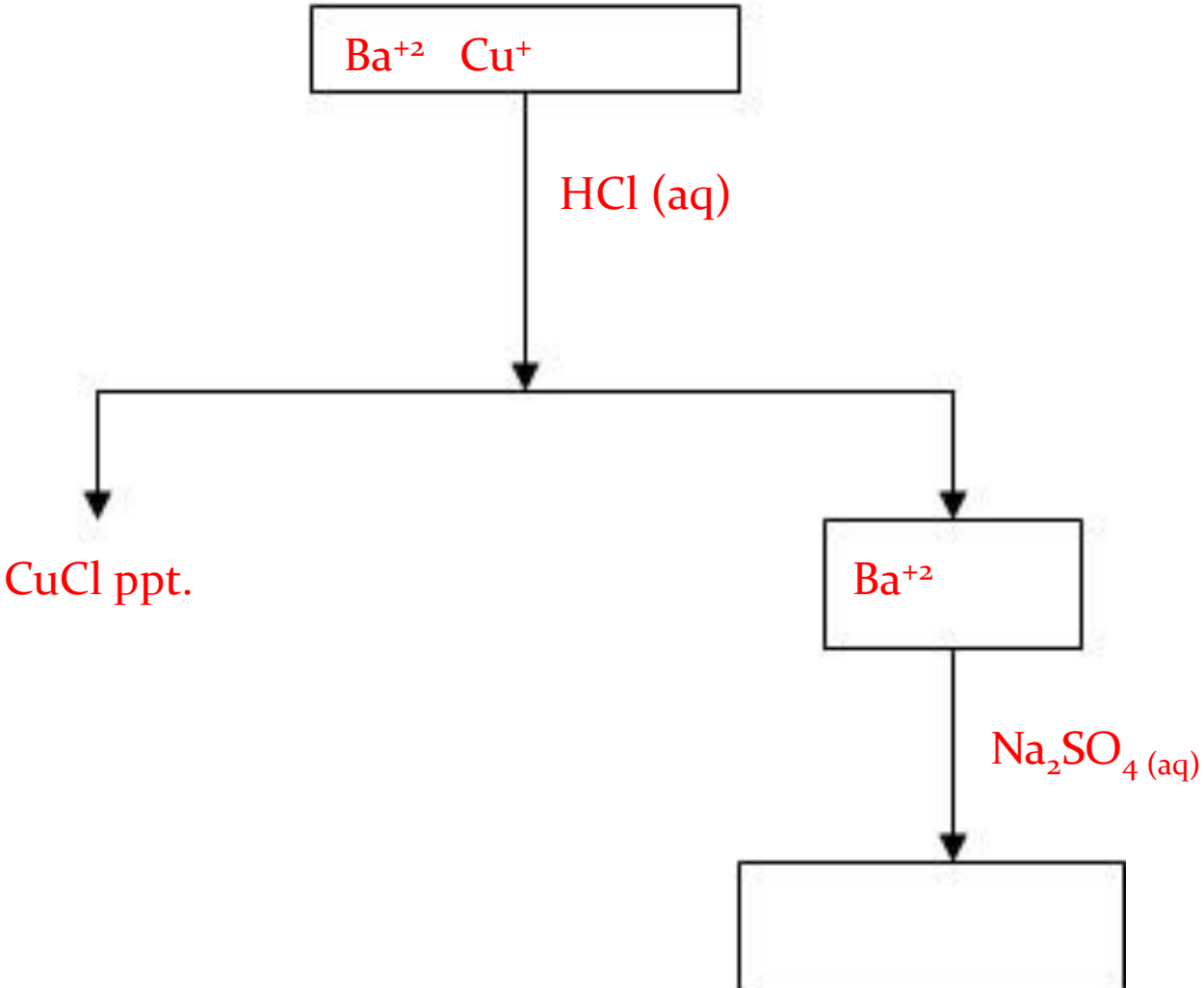
Use flow charts to help you organize the proper experimental procedure!



3. 5. Using Solubility Table and Precipitation to Identify Ions

d) Flow Charts Rule!

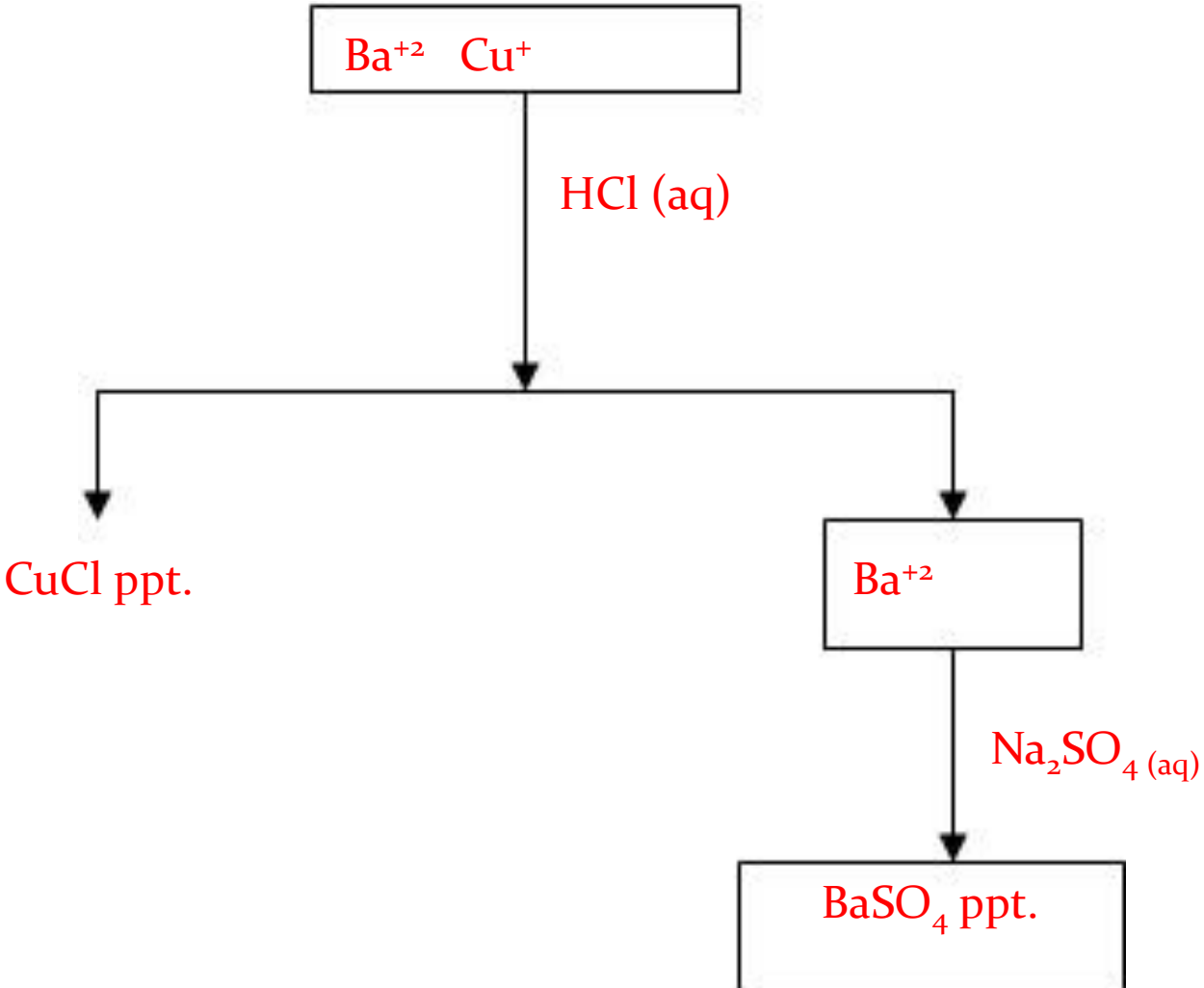
Use flow charts to help you organize the proper experimental procedure!



3. 6. Using Solubility Table and Precipitation to Identify Ions

d) Flow Charts Rule!

Use flow charts to help you organize the proper experimental procedure!



3. 5. Using Solubility Table and Precipitation to Identify Ions

HW: Read through examples on page 88-89, section III.5

Do questions: #26-37 page 90-91