

Worksheet #C38: Working With Solubility**Solubility Rules (Ionic Compounds at 25°C)**

- 1) -nitrate and -acetate = (aq)
- 2) Group 1 (H^+ , Li^+ , Na^+ , K^+ , Rb^+ , Cs^+ , Fr^+) and NH_4^+ = (aq)
- 3) -chloride, -bromide, and -iodide = (aq)
EXCEPT when with Pb , Hg_2 , or Ag = (s)
- 4) -sulfate = (aq)
EXCEPT when with Ba , Ca , Pb , or Hg_2 = (s)
- 5) -hydroxide = (s)
EXCEPT when with Group 1 or NH_4^+ = (aq)
When with Group 2 (Be , Mg , Ca , Sr , Ba , Ra) = (ss)
- 6) -sulfide, -carbonate, and -phosphate = (s)
EXCEPT when with Group 1 or NH_4^+ = (aq)

Questions:

1. What does "aq" stand for? _____
 - a. What does it mean? _____
2. What does "s" stand for? _____
3. For each of the following, say whether the substance will be aq or s in water:
 - a. barium sulfate _____
 - b. ammonium phosphate _____
 - c. lithium chloride _____
 - d. silver acetate _____
 - e. copper II hydroxide _____
 - f. $PbCl_2$ _____
 - g. Na_2CO_3 _____
 - h. CaS _____
 - i. $(NH_4)_2SO_4$ _____
 - j. $PbBr_2$ _____
 - k. Li_3PO_4 _____

Making These Useful: Mini Lab

At your lab station are three bottles marked A, B, and C. In these bottles are sodium sulfate, lead II nitrate, and silver nitrate (although not necessarily in that order). You also have a marked bottle of sodium hydroxide. Your job is to figure out which is which by reacting each with the others.

I. Before you go to the lab: determine which combinations should produce a solid precipitate and which should not. To do this, write the balanced equation for each possibility:

1) sodium sulfate + lead II nitrate

2) sodium sulfate + silver nitrate

3) lead II nitrate + silver nitrate

4) Between sodium sulfate, lead nitrate, and silver nitrate, two should form a precipitate with sodium hydroxide. Which are they? _____ and _____

Record your expected results in the table below. Write "ppt" if you expect there to be a solid precipitate and "NR" if there is no reaction

	sodium sulfate	lead II nitrate	silver nitrate	sodium hydroxide
sodium sulfate				
lead II nitrate				
silver nitrate				
sodium hydroxide				

2. Now go to the lab and test the three chemicals using one drop of each on the small piece of plastic overhead projector paper. Record your actual results in the table below.

	A	B	C	sodium hydroxide
A				
B				
C				
sodium hydroxide				

3. Finally, compare the two tables to determine which was which:

A = _____ C = _____

B = _____