

Name: _____
Blk: _____ Date: _____

Chemistry 12
Solubility Lesson #3
PREDICTING THE SOLUBILITY OF SALTS

The term "**SOLUBLE**" is used to describe a substance that will _____
100% in _____.

As nothing is truly **INSOLUBLE** we use the term "**LOW SOLUBILITY**" to
describe a substance that will not _____ 100% in _____.

A substance is said to have "**LOW SOLUBILITY**" if a saturated solution of the
substance is _____!!!!

NOTE: the phrase "having a solubility less than 0.1M" is often represented in the
form of

"EQUAL VOLUMES OF 0.2 M cmpd A and 0.2 M cmpd B ARE MIXED"

After **DILUTION**, both cmpd A and cmpd B are present as 0.1 M solutions. IF a
precipitate forms when A and B are mixed, the precipitate qualifies as having
LOW SOLUBILITY.

Let us investigate the table
"**SOLUBILITY OF COMMON COMPOUNDS IN WATER**" found on pg 4 of the
Data Booklet.

The Table is divided so that

1. the _____ (negative ions) are in the first column
 2. the _____ (positive ions) are in the second column
- NOTE:** recall that the **ALKALI IONS** include **Li⁺, Na⁺, K⁺, Rb⁺, Cs⁺, and Fr⁺**
3. the solubility of the possible compound is in the third column

Example 1. Determine whether or not FeCO_3 is soluble or has low solubility

1. Break the compound down into it's component ions:
 1. First locate the **anion**:
2. Beside the anion try to locate the corresponding **cation**:
3. Identify the outcome from combining the anion and cation from the third column:

NOTE: the term **LOW SOLUBILITY** means that a **PRECIPITATE** will form
The term **SOLUBLE** means that **NO PRECIPITATE** will form.

Example 2. Will a precipitate form when equal volumes of CaS and Na₂SO₄ are mixed?

1. Write out the double replacement reaction without indicating the phases:
2. Break apart the products into component ANION and CATION
3. Locate the first ANION and it's corresponding CATION on the table, what is the outcome when these are paired?
4. Locate the first ANION and it's corresponding CATION on the table, what is the outcome when these are paired?
5. Go back to the double replacement equation and fill in (s) beside the precipitate and (aq) beside the soluble compound.

NOTE: be aware that some TRANSITION METALS have MULTIPLE IONIC CHARGES ie. **Cu⁺** and **Cu²⁺** these ions act differently when paired with the same ANION

Cu⁺ has LOW SOLUBILITY with Cl⁻, Br⁻ and I⁻

Cu²⁺ is SOLUBLE with Cl⁻, Br⁻ and I⁻

SOME IMPORTANT GENERALIZATIONS:

1. Compounds containing:
Are soluble in WATER!!!

2. It is therefore difficult to PRECIPITATE the
From solution

3. IF you have to write the formula for a SOLUBLE COMPOUND use the
*******RULE OF N*******

a. to introduce a desired ANION into a solution use **Na⁺**

b. to introduce a desired CATION into a solution use **NO₃⁻**.

SEATWORK/HOMEWORK: Exercises 21-24 pgs 83-84

PLO's: H1, H2, H3