

## Solubility Rules for Ionic Compounds

### A. SOLUBLE COMPOUNDS

1. **Group 1 Elements**

Compounds containing  $\text{Na}^+$ ,  $\text{K}^+$ , and  $\text{Li}^+$  are generally soluble.

2. **Ammonium Ions**

Compounds containing  $\text{NH}_4^+$  are usually soluble.

3. **Nitrates**

Compounds containing  $\text{NO}_3^-$  are usually soluble.

4. **Acetates**

Compounds containing  $\text{C}_2\text{H}_3\text{O}_2^-$  are usually soluble.

5. **Chlorates and Perchlorates**

Compounds containing  $\text{ClO}_3^-$  and  $\text{ClO}_4^-$  are usually soluble.

6. **Halogens**

Compounds containing chlorides ( $\text{Cl}^-$ ), bromides ( $\text{Br}^-$ ), and iodides ( $\text{I}^-$ ) are usually soluble.

• *Exceptions:* Combinations with  $\text{Ag}^+$ ,  $\text{Hg}^{2+}$ , or  $\text{Pb}^{2+}$ .

7. **Sulfates**

Compounds containing  $\text{SO}_4^{2-}$  are usually soluble.

• *Exceptions:* Combinations with  $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Pb}^{2+}$ ,  $\text{Hg}^+$ , and  $\text{Ag}^+$ .

### B. INSOLUBLE COMPOUNDS

1. **Carbonates**

Compounds containing  $\text{CO}_3^{2-}$  are generally NOT soluble.

• *Exceptions:* Combinations with **Group 1 Metals** or  $\text{NH}_4^+$

2. **Phosphates**

Compounds containing  $\text{PO}_4^{3-}$  are generally NOT soluble.

• *Exceptions:* Combinations with **Group 1 Metals** or  $\text{NH}_4^+$

3. **Sulfides**

Compounds containing  $\text{S}^{2-}$  are generally NOT soluble.

• *Exceptions:* Combinations with **Group 1 Metals**, **Group 2 Metals** or  $\text{NH}_4^+$

4. **Hydroxides**

Compounds containing  $\text{OH}^-$  are generally NOT soluble.

• *Exceptions:* Combinations with **Group 1 Metals** or **Group 2 Metals**.