

## Solubility Rules

1. All common salts of Group 1 elements and ammonium ( $\text{NH}_4^{1+}$ ) are soluble.
2. All common **nitrates** ( $\text{NO}_3^{1-}$ ) and acetates are soluble.
3. Most chlorides, bromides, and iodides are soluble except silver, lead (II), and mercury (I)
4. All sulfates are soluble except barium, strontium, lead (II), calcium, silver, and mercury (I)
5. Except for those in Rule 1, carbonates, hydroxides, oxides, and phosphates are **insoluble**.

The table that follows sums up solubility tests for over 100 ionic compounds. Positive ions are listed at the left. Negative ions are listed across the top. To read the table, start with a positive ion from the left column such as aluminum. As you read across the aluminum row, data is given for the following compounds: aluminum acetate (ss, slightly soluble), aluminum bromide (s, soluble), aluminum carbonate (not exist, not known to exist), and so on. The “decomp” indicates that the compound chemically reacts with water and decomposes.

	<b>acetate</b>	<b>bromide</b>	<b>carbonate</b>	<b>chloride</b>	<b>chromate</b>	<b>hydroxide</b>	<b>iodide</b>	<b>nitrate</b>	<b>phosphate</b>	<b>sulfate</b>	<b>sulfide</b>
<b>aluminum</b>	ss	soluble	not exist	soluble	not exist	nearly insol	soluble	soluble	nearly insol	soluble	decomp
<b>ammonium</b>	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble
<b>barium</b>	soluble	soluble	nearly insoluble	soluble	nearly insoluble	soluble	soluble	soluble	nearly insoluble	nearly insoluble	decomp
<b>calcium</b>	soluble	soluble	nearly insoluble	soluble	soluble	ss	soluble	soluble	nearly insoluble	ss	decomp
<b>copper (II)</b>	soluble	soluble	nearly insoluble	soluble	nearly insoluble	nearly insoluble	decomp	soluble	nearly insoluble	soluble	nearly insoluble
<b>iron (II)</b>	soluble	soluble	nearly insoluble	soluble	not exist	nearly insoluble	soluble	soluble	nearly insoluble	soluble	nearly insoluble
<b>iron (III)</b>	soluble	soluble	not exist	soluble	nearly insoluble	nearly insoluble	not exist	soluble	nearly insoluble	ss	decomp
<b>lead (II)</b>	souble	ss	nearly insoluble	ss	nearly insoluble	nearly insoluble	ss	soluble	nearly insoluble	nearly insoluble	nearly insoluble
<b>magnesium</b>	soluble	soluble	nearly insoluble	soluble	soluble	nearly insoluble	soluble	soluble	nearly insoluble	soluble	decomp
<b>mercury (I)</b>	ss	nearly insoluble	nearly insoluble	nearly insoluble	ss	not exist	nearly insoluble	soluble	nearly insoluble	ss	nearly insoluble
<b>mercury(II)</b>	soluble	ss	nearly insoluble	soluble	ss	nearly insoluble	nearly insoluble	soluble	nearly insoluble	decomp	nearly insoluble
<b>potassium</b>	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble
<b>silver</b>	ss	nearly insoluble	nearly insoluble	nearly insoluble	ss	not exist	nearly insoluble	soluble	nearly insoluble	ss	nearly insoluble
<b>sodium</b>	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble	soluble
<b>zinc</b>	soluble	soluble	nearly insoluble	soluble	soluble	nearly insoluble	soluble	soluble	nearly insoluble	soluble	nearly insoluble