

=Use To Determine The Solubility Of A Compound=

Table C-10

Solubility Guidelines

A substance is considered soluble if more than three grams of the substance dissolves in 100 mL of water. The more common rules are listed below.

1. All common salts of the group 1A elements and ammonium ions are soluble.
2. All common acetates and nitrates are soluble.
3. All binary compounds of group 7A elements (other than F) with metals are soluble except those of silver, mercury(I), and lead.
4. All sulfates are soluble except those of barium, strontium, lead, calcium, silver, and mercury(I).
5. Except for those in Rule 1, carbonates, hydroxides, oxides, sulfides, and phosphates are insoluble.

Solubility of Compounds in Water

	Acetate	Bromide	Carbonate	Chlorate	Chloride	Chromate	Hydroxide	Iodide	Nitrate	Oxide	Perchlorate	Phosphate	Sulfate	Sulfide
Aluminum	S	S	—	S	S	—	I	S	S	I	S	I	S	D
Ammonium	S	S	S	S	S	S	S	S	S	—	S	S	S	S
Barium	S	S	P	S	S	I	S	S	S	S	S	I	I	D
Calcium	S	S	P	S	S	S	S	S	S	P	S	P	P	P
Copper (II)	S	S	—	S	S	—	I	—	S	I	S	I	S	I
Hydrogen	S	S	—	S	S	—	H ₂ O	S	S	S	S	S	S	S
Iron(II)	—	S	P	S	S	—	I	S	S	I	S	I	S	I
Iron(III)	—	S	—	S	S	I	I	S	S	I	S	P	P	D
Lead(II)	S	S	—	S	S	I	P	P	S	P	S	I	P	I
Lithium	S	S	S	S	S	?	S	S	S	S	S	P	S	S
Magnesium	S	S	P	S	S	S	I	S	S	I	S	P	S	D
Manganese(II)	S	S	P	S	S	—	I	S	S	I	S	P	S	I
Mercury(I)	P	I	I	S	I	P	—	I	S	I	S	I	P	I
Mercury(II)	S	S	—	S	S	P	I	P	S	P	S	I	D	I
Potassium	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Silver	P	I	I	S	I	P	—	I	S	P	S	I	P	I
Sodium	S	S	S	S	S	S	S	S	S	D	S	S	S	S
Strontium	S	S	P	S	S	P	S	S	S	S	S	I	P	S
Tin(II)	D	S	—	S	S	I	—	S	D	I	S	I	S	I
Tin(IV)	S	S	—	—	S	S	I	D	—	I	S	—	S	I
Zinc	S	S	P	S	S	P	P	S	S	P	S	I	S	I

S – soluble

P – partially soluble

I – insoluble

D – decomposes

phase: (aq)

phase: (s)

= Use To Predict Single-Replacement Reactions =

The Activity Series

Activity Increases ↑

Activity Series of Metals	
Metal	Reactions
Lithium Rubidium Potassium Calcium Sodium	All replace the hydrogen in water and acids. Each replaces metals listed below it.
Magnesium Aluminum Manganese Zinc Iron Nickel Tin Lead	All replace the hydrogen in acids. Each replaces metals listed below it.
Copper Silver Platinum Gold	All are mostly unreactive as far as replacing other metals in a compound.

Activity Increases ↑

Activity Series of Halogens	
Halogen	Reactions
Fluorine Chlorine Bromine Iodine	Each replaces halogens listed below it.