

Compounds Containing the Following Ions Are Generally <u>So<i>luble</i></u>	Exceptions
Li+, Na+, K+, and NH <sub>4</sub> +	None
NO <sub>3</sub> -, CH <sub>3</sub> COO-	None
Cl <sup>-</sup> , Br <sup>-</sup> , and l <sup>-</sup>	When these ions pair with Ag+, Hg <sub>2</sub> <sup>2+</sup> , or Pb <sup>2+</sup> => insoluble compounds
SO <sub>4</sub> <sup>2-</sup>	When SO <sub>4</sub> <sup>2-</sup> pairs with Ca <sup>2+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> , Pb <sup>2+</sup> , or Ag <sup>+</sup> => insoluble

Compounds Containing the Following Ions Are Generally <i>Insoluble</i>	Exceptions
	When these ions pair with Li <sup>+</sup> , Na <sup>+</sup> , K <sup>+</sup> , or NH <sub>4</sub> <sup>+</sup> => soluble
OH- and S²-	When S <sup>2-</sup> pairs with Ca <sup>2+</sup> , Sr <sup>2+</sup> or Ba <sup>2+</sup> => soluble
	When OH <sup>-</sup> pairs with Ca <sup>2+</sup> , Sr <sup>2+</sup> or Ba <sup>2+</sup> => slightly soluble
CO <sub>3</sub> <sup>2-</sup> and PO <sub>4</sub> <sup>3-</sup>	When these ions pair with Li⁺, Na⁺, K⁺, or NH₄⁺ => soluble

## Activity series of metals in aqueous solutions:

## Metal oxidation reaction

Li Li 
$$\rightarrow$$
 Li<sup>+</sup> + e<sup>-</sup>  
K K  $\rightarrow$  K<sup>+</sup> + e<sup>-</sup>  
Ba Ba  $\rightarrow$  Ba<sup>2+</sup> + 2e<sup>-</sup>  
Sr Sr  $\rightarrow$  Sr<sup>2+</sup> + 2e<sup>-</sup>

$$Sr$$
  $Sr \rightarrow Sr^{2^+} + 2e^-$   
 $Ca$   $Ca \rightarrow Ca^{2^+} + 2e^-$ 

Na Na 
$$\rightarrow$$
 Na  $^+$  + e

$$Mg \longrightarrow Mg^{2+} + 2e^{-}$$

Al 
$$Al \rightarrow Al^{3+} + 3e^{-}$$
  
Mn  $Mn \rightarrow Mn^{2+} + 2e^{-}$ 

$$Zn$$
  $Zn \rightarrow Zn^{2+} + 2e^{-}$   
 $Cr$   $Cr \rightarrow Cr^{3+} + 3e^{-}$ 

Cr Cr 
$$\rightarrow$$
 Cr<sup>3+</sup> + 3e<sup>-</sup>  
Fe Fe  $\rightarrow$  Fe<sup>2+</sup> + 2e<sup>-</sup>

$$Cd \qquad Cd \ \rightarrow \ Cd^{2^+} \ + \ 2e^{-}$$

Co Co 
$$\rightarrow$$
 Co<sup>2+</sup> + 2e<sup>-</sup>

Ni Ni 
$$\rightarrow$$
 Ni<sup>2+</sup> + 2e<sup>-</sup>  
Sn Sn  $\rightarrow$  Sn<sup>2+</sup> + 2e<sup>-</sup>

Pb Pb 
$$\rightarrow$$
 Pb<sup>2+</sup> + 2e<sup>-</sup>

$$H ext{ } H_2 o 2H^+ + 2e^-$$

Cu Cu 
$$\rightarrow$$
 Cu<sup>2+</sup> + 2e<sup>-</sup>

$$Hg Hg \rightarrow Hg^{2+} + 2e^{-}$$

$$Ag Ag Ag^+ + e^-$$

$$\begin{array}{ccc} Ag & Ag \rightarrow Ag^{+} + e^{-} \\ Au & Au \rightarrow Au^{3+} + 3e^{-} \end{array}$$

Can displace  $H_2$  from water, steam or acid

> Can displace  $H_2$  from steam or acid

Can displace H<sub>2</sub> from acid

> Cannot displace H2 from any source

## Ease of Oxidation increases

	8.A	18	7	He	4.003	10	Ne	20.18	18	Ār	39.95	3,6	Ž Ž	83.80	54	Xe	131.29	86	Rn	[222.02]	Succession (Continue of the Continue of the Co			
				7.A	17	6	щ	19.00	17	ひ	35.45	35	B	79.90	53	I	126,90	85	Āt	[209.99]	Magazina and a second		overe con-	
Main groups				6A	16	80	0	16.00	16	s	32,07	34	Se	78.96	52	Te	127.60	84	Po	[208.98]	116		[292]	e de la companya de l
Main				5A	15	7	Z	14.01	15	Ч	30.97	33	As	74.92	51	Sb	121.76	8.3	Bi	208.98				Andrew Company of the
				44	14	9	ပ	12.01	14	Si	28.09	32	Ge	72.64	50	Sn	118.71	82	Pb	207.2	114		[589]	COLOR DE LA COLOR
				3A	13	5	B	10.81	13	Ψ	26.98	31	Ga	69.72	49	In	114.82	81	I	204.38				Spirital Section (Spirital)
										2B	12	30	Zn	65.38	48	P)	112.41	80	Hg	200.59	112*		[277]	National Probability School Services
				netals						1B	11	29	Cu	63.55	47	Ag	107.87	79	Αn	196.97	111	Rg	[272]	
			Г	Nonmetals	1					Γ	10	28	Z	58.69	46	Ьd	106.42	78	Pt	195.08	110	Ds	[271]	Winderland (Colonial Colonial
			L		postale.					— 8B —	6	27	೦	58.93	45	Rh	102.91	77	Ir	192.22	109	Mt	[268.14]	
				Metalloids				Transition metals		L	8	26	Fe	55,85	44	Ru	101.07	92	so	190.23	108	Hs	[269.13]	Andrew Comment
				Ĭ	- months and the			Transitio		7B	7	25	Mn	54.94	43	Тc	[86]	75	Re	186.21	107	Bh	[264.12]	
			L	s	_					6B	9	24	j	52.00	42	Mo	95.96	74	×	183.84	901	Sg	[266.12]	
			Γ"	Metals	7					5B	5	23	>	50.94	41	ź	92.91	73	Ta	180.95	105	Dp	[262.11]	
					2000					4B	4	22	Ξ	47.87	40	Zr	91.22	72	H	178.49	104	Rf	[261.11]	
٢	_				۳.	فللصعد	identes	متجنست		3B	3	21	Sc	44.96	39	<b>X</b>	16'88	57	La	138.91	89	Ac	[227.03]	
Main groups			(	۲ <del>۷</del>	2	4,	Be	9.012	12	Mg	24.31	20	ప	40.08	38	Sr	87.62	26	Ba	137.33	88	Ra	[226.03]	
Main	$^{1}A^{a}$		н	1.008	HOLD STATE OF THE PARTY OF THE	m ;		6.941			22.99	19		39.10	37	SP.	85.47	55	ప	132.91	87	Ä	[223.02]	
			-	_		,	7			c			4			5			9			7		

68 69 70 71	Et Im Yb Lu	167.26 168.93 173.05	101	Md No	[257,10] [258.10] [259.10] [2
67	Ho	164.93	66	Es	[252.08]
99	Dy	162.50	86	Cť	[251.08]
65	TP	158.93	97	Bk	[247.07]
64	P.S	157.25	96	Сш	[247.07]
63	Eu	151,96	95	Αm	[243.06]
62	Sm	150,36	94	Pu	[244.06]
. 19	Pm	[145]	93	Np	[237.05]
09	PZ	144.24	92	D	238.03
29	Pr	140.91	91	Pa	231.04
58	<b>ಿ</b>	140.12	96	Th	232.04
,	Lanthanide series			Actinide series	

<sup>a</sup>The labels on top (1A, 2A, etc.) are common American usage. The labels below these (1, 2, etc.) are those recommended by the International Union of Pure and Applied Chemistry.

The names and symbols for elements 112 and above have not yet been decided.

Atomic masses in brackets are the masses of the longest-lived or most important isotope of radioactive elements.

\*Element 112 has a proposed name of Copernicium which is, at the time of this publication, under review by IUPAC.