

College Prep (CP) Chemistry of the Earth Data Tables

Ionic Compound Bonding and Nomenclature Data Sheets

Binary Atoms and Ions Data Tables

Group Number	1A 1	2A 2	1B – 10B	3A 13	4A 14	5A 15	6A 16	7A 17	8A 18
Element Type	Rep Metals	Rep Metals	Trans Metals	Rep Metals*	Non-Metals*	Non-Metals*	Non-Metals	Non-Metals	Non-Metals
Valance Electrons (e ⁻)	1	2	2	3	4	5	6	7	8
Ion Charge	+1	+2	Var. +1 to +7	+3	+4/-4	-3	-2	-1	0
Lewis Dot Structure	X •	• X •	• X •	• X •	• X •	• X •	• X •	• X •	• X •

*Includes Transition Metals (*Ga, In, Tl, Pb, Sn*) and Metalloids (*B, Si, Ge, As, Sb, Te, Po*)

Roman Numerals for Transition Metal Charges

Trans. Metal Charge	+1	+2	+3	+4	+5	+6	+7
Roman Numeral*	I	II	III	IV	V	VI	VII

Metal Ion Nomenclature: Rep Metal Ion, Trans. Metal (Charge) Ion

Binary Atom and Ion Nomenclature

Atomic Number	Periodic Group	Element Symbol	Element Name	Lose / Gain e ⁻	Ion Charge	Ion Name
1	1A / 1	H	Hydrogen	Lose 1e ⁻	+1	Hydride Ion
6	4A / 14	C	Carbon	Gain 4e ⁻	-4	Carbide Ion
7	5A / 15	N	Nitrogen	Gain 3e ⁻	-3	Nitride Ion
15	5A / 15	P	Phosphorous	Gain 3e ⁻	-3	Phosphide Ion
33	5A / 15	As	Arsenic	Gain 3e ⁻	-3	Arsenide Ion
8	6A / 16	O	Oxygen	Gain 2e ⁻	-2	Oxide Ion
16	6A / 16	S	Sulfur	Gain 2e ⁻	-2	Sulfide Ion
34	6A / 16	Se	Selenium	Gain 2e ⁻	-2	Selenide Ion
52	6A / 16	Te	Tellurium	Gain 2e ⁻	-2	Telluride Ion
9	7A / 17	F	Fluorine	Gain 1e ⁻	-1	Fluoride Ion
17	7A / 17	Cl	Chlorine	Gain 1e ⁻	-1	Chloride Ion
35	7A / 17	Br	Bromine	Gain 1e ⁻	-1	Bromide Ion
53	7A / 17	I	Iodine	Gain 1e ⁻	-1	Iodide Ion
85	7A / 17	At	Astatine	Gain 1e ⁻	-1	Astatide Ion

Standard Base Form Polyatomic Ions

+1 Polyatomic Ions		-1 Polyatomic Ions		-2 Polyatomic Ions		-3 Polyatomic Ions	
H ₃ O ¹⁺	Hydronium Ion	FO ₃ ¹⁻	Fluorate Ion	CO ₃ ²⁻	Carbonate Ion	PO ₄ ³⁻	Phosphate Ion
NH ₄ ¹⁺	Ammonium Ion	ClO ₃ ¹⁻	Chlorate Ion	C ₂ O ₄ ²⁻	Oxalate Ion		
		BrO ₃ ¹⁻	Bromate Ion	SO ₄ ²⁻	Sulfate Ion		
-1 Polyatomic Ions		IO ₃ ¹⁻	Iodate Ion	S ₂ O ₃ ²⁻	Thiosulfate Ion		
OH ¹⁻	Hydroxide Ion	NO ₃ ¹⁻	Nitrate Ion	HPO ₄ ²⁻	Hydrogen Phosphate		
CN ¹⁻	Cyanide Ion	C ₂ H ₃ O ₂ ¹⁻	Acetate Ion	CrO ₄ ²⁻	Chromate Ion		
SCN ¹⁻	Thiocyanate Ion	HCO ₃ ¹⁻	Bicarbonate Ion	Cr ₂ O ₇ ²⁻	Dichromate Ion		
OCN ¹⁻	Cyanate Ion	MnO ₄ ¹⁻	Permanganate Ion				

Conjugated Form Polyatomic Ions

+1 Oxygen (Per ____ ate Ion)		Base Form (____ ate Ion)		-1 Oxygen (____ ite Ion)		+2 Oxygen (Hypo ____ ite Ion)	
FO_4^{1-}	Perfluorate Ion	FO_3^{1-}	Fluorate Ion	FO_2^{1-}	Fluorite Ion	FO^{1-}	Hypofluorite Ion
ClO_4^{1-}	Perchlorate Ion	ClO_3^{1-}	Chlorate Ion	ClO_2^{1-}	Chlorite Ion	ClO^{1-}	Hypochlorite Ion
BrO_4^{1-}	Perbromate Ion	BrO_3^{1-}	Bromate Ion	BrO_2^{1-}	Bromite Ion	BrO^{1-}	Hypobromite Ion
IO_4^{1-}	Periodate Ion	IO_3^{1-}	Iodate Ion	IO_2^{1-}	Iodite Ion	IO^{1-}	Hypoiodite Ion
		NO_3^{1-}	Nitrate Ion	NO_2^{1-}	Nitrite Ion		
		CO_3^{2-}	Carbonate Ion	CO_2^{2-}	Carbonite Ion		
		SO_4^{2-}	Sulfate Ion	SO_3^{2-}	Sulfite Ion		
		CrO_4^{2-}	Chromate Ion	CrO_3^{2-}	Chromite Ion		
		$\text{Cr}_2\text{O}_7^{2-}$	Dichromate Ion	$\text{Cr}_2\text{O}_6^{2-}$	Dichromite Ion		
		PO_4^{3-}	Phosphate Ion	PO_3^{3-}	Phosphite Ion		

Binary and Polyatomic Acid Nomenclature and Conjugations

Binary Acid	Hydro ____ ic Acid	Polyatomic Acid (-ate)	____ ic Acid	Polyatomic Acid (-ite)	____ ous Acid
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*Binary Acid: HX, Polyatomic Acid: HXO_y (ate/ite based on polyatomic ion nomenclature)