Element	Formula	System/ Cleavage	Streak	Miscellaneous
Native Elements				
Copper	Cu	Isometric/ irregular masses	Brownish	High SG, metal sound
Sulfur	S	Orthorhombic/ massive	Light yellow	Rotten egg smell, bright yellow color
Graphite	C	Tabular Crystals/ 0001	Gray	Greasy look and feel, metallic luster
Sulfides and Sulfosalts				
Chalcocite	Cu_2S	Massive	Black	Leaves black film on hands
Bornite	Cu_5FeS_4	Massive/ rarely Tetragonal	Brownish - Gray - Black	Buish and purpleish. Greasy color
Galena	PbS	Isometric 001	Gray	High SG
Sphalerite	ZnS	Isometric/ small dodecahedrons	White - Brown	Perfect cleavage and hardness, low SG
Chalcopyrite	$CuFeS_2$	Massive	Greenish Gray	Metallic luster - Golden
Pyrrhotite	$Fe_{1-x}S$	Massive	Black	Magnetic
Covellite	CuS	Basal - 0001	Dark Gray - Black	Indigo blue color, iridescent, metallic luster
Cinnabar	HgS	Massive/ rhombohedral	Scarlet	Bright red color, high SG
Realgar	AsS	001 good	Bright Orange	Mixture of colors - Yellow, red, gray
Orpiment	As_2S_3	010	Golden	Golden color, excellent cleavage
Stibnite	Sb_2S_3	Slender crystals/ Striations	Olivine - Green	Similar to Galena but different cleavage and SG
Pyrite	FeS_2	Massive/ Choncoidal fracture	Greenish Black	Gold color, harder than 6, duller than Chalcopyrite
Marcasite	FeS_2	Radiating forms	Gray - Black	Spearhead appearance, pale yellow color and metallic crystals
Arsenopyrite	FeAsS	Granular/ Poor 101	Black	Silver white color, high hardness, 5.5-6

Molybdenite	**MoS_2**	Massive/ Perfect 0001	Silver - Gray Black	Very soft 1-1.5, occurs with quartz
Enargite	**Cu_3AsS_4**	Perfect 110	Gray - Iron Black	Metallic luster, similar to pyrite
Oxides and Hydroxides				
Spinel Group (AB_2O_4)				
Magnetite	**Fe_3O_4**	Isometric/ massive	Black	Magnetic
Chromite	**$FeCr_2O_4$**	Massive	Dark Brown	Iron black, no magnetism
Spinel	**$MgAl_2O_4$**	Isometric/ massive	White	Very hard - 8, nonmagnetic, white streak
Franklinite	**(Zn,Fe,Mn)-$(FeMn)_2O_4$**	Massive/ granular	Red and Black	Associated with Zincite, mixture of red and black and white
Hematite Group (A_2O_3)				
Corundum	**Al_2O_3**	Hexagonal barrels	-	Known for hardness - 9, has Mica imbedded in it
Hematite	**Fe_2O_3**	Massive/ radiating structure	Red - Brown	Red streak, earthy metallic luster
Ilmenite	**$FeTiO_3$**	Massive/ granular	Black - Brownish Red	Contains small flat silvery surfaces
Rutile Group (AO_2)				
Rutile	**TiO_2**	Tretragonal/ prismatic	Pale Brown	Located as dots in a predominatly white, Adamantine luster
Pyrolusite	**MnO_2**	Fibrous/ granular/ massive	Iron Black	Soils fingers, very black streak
Cassiterite	**SnO_2**	Massive/ fibrous	Black - Brown	High SG, adamantine luster, light streak
Other				
Cuprite	**Cu_2O**	Isometric crystals	Brown	Red color, high luster, associated with limonite
Zincite	**ZnO**	Granular	Red and Black	Red color, associated with Franklinite

Hydroxides				
Brucite	**$Mg(OH)_2$**	Massive	White	Pearly white, harder than Talc but not elastic like Mica
Goethite	**FeO(OH)**	Orthorhombic/ 010	Yellow - Brown	Radiating fibrous aggregation, bubbly
Bauxite		A Mixture of 3 Minerals	Yellow - Brown/ Orange	Very light and porous, and a mixture of different colors
Gibbsite	**$Al(OH)_3$**			
Boehmite	**AlO(OH)**			
Diaspore	**$HAlO_2$**			
Halides				
Halite	**NaCl**	Isometric	Colorless - White	Tastes like salt
Sylvite	**KCl**	Isometric	White	Bitter taste
Cryolite	**Na_3AlF_6**	Cubical forms due to parting	White	Looks like watery snow
Fluorite	**CaF_2**	Isometric	White	Perfect cleavage, fine colors
Carbonates				
Distinctive Colors				
Rhodochrosite	**$MnCO_3$**	Massive/ rhombohedral crystals	Pink - Red	Not soluble in cold HCl, hardness 4, red color
Siderite	**$FeCO_3$**	Rhombohedral crystals	Light Brown	Well crystallized face, not soluble in HCl
Malachite	**$Cu_2CO_3(OH)_2$**	Radiating fibers/ stalactic masses	Light Green	HCl reaction, earthy, green, botryoidal forms
Azurite	**$Cu_3(CO_3)_2(OH)_2$**	Radiating spherical groups	Dark Blue	HCl reactions, intense blue color
Hexagonal with rhombohedral cleavage				
Calcite	**$CaCO_3$**	Rhombohedral	White - Colorless	Low SG, Hardness 2.5-3, HCl reaction
Dolomite	**$CaMg(CO_3)_2$**	Rhombohedral	White - Clear	Curved/ saddle shaped crystals, powdered HCl reaction
Magnesite	**$MgCO_3$**	Granular masses	White	Resembles chert but lower hardness, no HCl reaction

Smithsonite	**$ZnCO_3$**	Granular	White	High SG, stalactic habit, no HCl reaction
Orthorhombic with no rhombohedral cleavage				
Cerussite	**$PbCO_3$**	Fibrous crystal aggregates	White - Light Brown	Very high SG, no HCl reaction
Aragonite	**$CaCO_3$**	Columnar crystals	White	Harder than Calcite, high SG, powdery appearance, HCl reaction
Witherite	**$BaCO_3$**	Orthorhombic/ striations	White	High SG, HCl reaction
Strontianite	**$SrCO_3$**	Fibrous with striations	White	High SG, powders easily, HCl reaction
Sulfates				
Barite	**$BaSO_4$**	Orthorhombic	White	High SG, Brown stuff with pearly luster
Celestite	**$SrSO_4$**	Basal perfect, prismatic	White	Light blue color, resembles Barite but low SG
Anglesite	**$PbSO_4$**	Orthorhombic	Light	High SG, associated with Galena
Anhydrite	**$CaSO_4$**	Massive, orthorhombic	Light	Looks like Gypsum but harder, vitreous luster
Gypsum	**$CaSO_4 \cdot 2H_20$**	Massive, monclinic	White	Very soft - 2, can be scratched by a fingernail
Borates				
Kernite	**$Na_2B_4O_7 \cdot 4H_2O$**	Monoclinic	White	Turns chalky white, low SG
Light				
Apatite	**$Ca_5(F,Cl,OH)\ (PO_4)_3$**	Hexagonal	Light	Green, long prismatic crystals
Monzanite	**$(Ce,La,Y,Th)PO_4$**	Monoclinic	Brown	Granular, occurs in sand, resinous luster
Amblygonite	**$LiAlFPO_4$**	Massive, triclinic	White	Hard - 6, might look like Feldspar
Wavellite	**$Al_3(PO_4)_2(OH)_3 \cdot 5H_2O$**	Radiating aggregates	-	Globular/ radiating forms

Tungstates				
Wolframite	**$(Fe,Mn)WO_4$**	Monoclinic	Brown - Black	Bladed/ tabular crystals, high SG
Scheelite	**$CaWO_4$**	Tetragonal	Light	Very high SG, vitreous luster
Tektosilicates				
Quartz	**SiO_2**	Conchoidal fracture	Colorless - White	Hexagonal crystals, hardness 7
Cristobalite	**SiO_2**	Small octahedrons in lava	-	Occurs with obsidian
Opal	**$SiO_2 \cdot nH_2O$**	Amorphous	Colorless - White	Milky appearance, flesh colored, play of colors
Feldspars				
Orthoclase/ Microcline	**$KAlSi_3O_8$**	Monoclinic, perfect 001	-	Looks like plagioclase but no striations
Plagioclase		Perfect 110	Colorless - White	Striations, colors ranges from:
Albite	**$NaAlSi_3O_8$**			White
Anorthite	**$CaAl_2Si_2O_8$**			to black
Feldspathoids				
Leucite	**$KAlSi_2O_6$**	Phenocrysts/ isometric	White	Crystal forming, does not occur with quartz, is white to gray color
Nepheline	**$NaAlSiO_4$**	Hexagonal	-	Black dots with Cancrinite, no striations
Cancrinite	**$Na_6Ca(CO_3)$-$(AlSiO_4)_6 \cdot 2H_2O$**	Hexagonal	-	Yellow, occurs with Nepheline
Sodalite	**$Na_8(AlSiO_4)_6Cl_2$**	Massive/ isometric	-	Very blue color, little crystal faces, associated with Nepheline

Zeolites				
Analcime	$NaAlSi_2O_6 \cdot H_2O$	Massive/ isometric	-	Forms crystals, but located in the matrix unlike Leucite
Stilbite	$CaAl_2SiO_{18} \cdot 7H_2O$	Tabular crystals/ sheaf-like aggregates		Occurs in cavities
Phyllosilicates				
Serpentine Group				
Antigorite	$Mg_6Si_4O_{10}(OH)_8$	Massive/ fine grained	White	Greasy luster
Chrysotile	$Mg_6Si_4O_{10}(OH)_8$	Hexagonal/ monoclinic	Greenish	Fibrous, silky luster
Clay Mineral Group				
Kaolinite	$Al_4Si_4O_{10}(OH)_8$	Massive/ triclinic	White	Earthy luster, feels soapy, writes on cloth
Montmorillonite	$Al_4Si_8O_{20}(OH)_4 \cdot nH_2O$	Massive	White	Earthy luster, expands with water
Talc	$Mg_3Si_4O_{10}(OH)_2$	Massive/ triclinic	White	Marks cloth, pearly, hardness 1
Pyrophyllite	$Al_2Si_4O_{10}(OH)_2$	Radiating aggregates	White	Marks easily
Mica Group				
Muscovite	$KAl_2(AlSi_3O_{10})(OH)_2$	Monoclinic	White - Clear	Elastic sheets, clear
Lepidolite	$KLiAl(AlSi_3O_{10})(OH)_2$	Massive/ monoclinic	-	Pastel colors, lilac, yellow and pink
Phlogopite	$KMg_3(AlSi_3O_{10})(OH)_2$	Monoclinic	-	Elastic sheets, yellowish brown
Biotite	$K(Mg,Fe)_3(AlSi_3O_{10})(OH)_2$	Monoclinic	-	Elastic sheets, black
Vermiculite	$Mg_3Si_4O_{10}(OH)_2 \cdot nH_2O$	Monoclinic	-	Elastic sheets, altered Biotite, expands upon heating, dark colors
Chlorite Group				
Chlorite	$Mg_6Si_8O_{20}(OH)_4$-$Mg_6(OH)_{12}$	Triclinic	-	Green-black colors, micaceous habit and cleavage
Prehnite	$Ca_2Al(AlSi_3O_{10})(OH)_2$	Crystalline aggregates	Light Green	Green color

Inosilicates				
Pyroxenes				
Diopside	**$CaMgSi_2O_6$**	Granular/ monoclinic	-	8 sided crystals, looks like olivine, white to green color, 2 directions cleavage
Augite	**$XYSi_2O_6$**	Monoclinic	Green	90^o cleavage unlike Hornblende, short crystals
Enstatite	**$MgSiO_3$**	Massive	-	Bronze like luster, dark green to dark brown
Spodumene	**$LiAlSi_2O_6$**	Prismatic crystals	-	Vitreous luster, vertical prismatic cleavage
Pyroxenoids				
Wollastonite	**$CaSiO_3$**	Massive/ fibrous	Colorless - White	Pearly, associated with Garnets, silky, elongated crystals
Rhodenite	**$MnSiO_3$**	Massive/ triclinic	White - Pink	Pink color, high hardness - 5.5-6, vitreous luster
Amphiboles				
Anthophyllite	**$(Mg,Fe)_7Si_8O_{22}(OH)_2$**	Fibrous	-	Like asbestos, clove brown color
Tremolite	**$Ca_2Mg_5Si_8O_{22}(OH)$**	Prismatic crystals/ bladed	White	White - green - purple, slender prisms
Actinolite	**$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$**	Columnar aggregates	Dark - Light Green	Looks like Tremolite, dark green color
Hornblende	**$XYSi_8O_{22}(OH)_2$**	Prismatic	Greenish	Non-90^o cleavage, silky appearance, looks like Augite
Neosilicates				
Olivine Series	**$(Mg,Fe)_2SiO_4$**	Granular/ conchoidal fracture	Brownish	Granular nature, green color
Garnet Series	**$A_3B_2(SiO_4)_3Mg\text{-}Fe\text{-}Mn\text{-}Ca\text{-}Al\text{-}Si_3O_{12}$**	Dodecahedrons/ isometric	-	Reddish/ brownish color, dodecahedron shape, hardness 6.5 - 7.5

Zircon	**$ZrSiO_4$**	Crystals/ tetragonal	-	Shades of brown, translucent, adamantine luster, high SG
Kyanite	**Al_2SiO_5**	Crystals/ triclinic	-	Bladed crystals, blue color
Andalusite	**Al_2SiO_5**	Course square prisms	-	Prisms, hardness 7.5, red colors
Silliminite	**Al_2SiO_5**	Fibrous masses	-	Long needle like crystals, pale colors
Topaz	**$Al_2SiO_4(F,OH)_2$**	Vertical striated faces	-	High hardness - 8, yellowish colors - clear, high SG
Staurolite	**$Fe_2Al_9O_6(SiO_4)_4(O,OH)_2$**	Cruciform twins	-	Brownish color, crystals
Sphene	**$CaTiO(SiO_4)$**	Wedge shaped crystals	-	Brownish colors, occurs with a Quartz-like mineral
Sorosilicates				
Epidote	**$Ca_2(Al,Fe)Al_2O(SiO_4)(Si_2O_7)OH$**	Monoclinic	-	Pistachio green, high hardness - 6-7, basal cleavage
Idocrase (Vesuvianite)	**Ca-Mg-Al-Si-O**	Tetragonal	-	Brown tetragonal crystals, lower SG than Garnet
Cyclosilicates				
Beryl	**$Be_3Al_2Si_6O_{18}$**	Vertically striated crystals	-	Light blue - green color, greater hardness than Apatite - 7.5-8
Cordierite	**$(Mg,Fe)_2Al_3(AlSi_5O_{18})$**	Orthorhombic	-	Various shades of blue-gray, resembles quartz
Tourmaline	**Na-Fe-Mg-Li-$Al(BO_3)$-$Si_6O_{18}(OH)$**	Conchoidal fracture	-	Spherical triangle cross section, black, striations