APPENDIX B

TABLES USEFUL IN THE DETERMINATION OF MINERALS

THIS Appendix contains a series of tables, more or less complete, of minerals arranged according to chemical composition or to certain prominent crystallographic or physical characters. These, it is believed, will be of service not only to the student, but also to the skilled mineralogist.

The type used in the printing of the mineral names indicates their relative importance. Table I is a complete list of the species named in this book arranged first according to the prominent basic elements which they contain and secondly according to their acid radicals. Table II is of Minerals arranged according to their System of Crystallization. The other tables make no claim to completeness, being limited often to common and important species.

For an exhaustive system of Determinative Tables based particularly upon blowpipe and chemical characters, the student is referred to the work of Professors Brush and Penfield, mentioned on p. 330.

TABLE I. MINERALS ARRANGED ACCORDING TO CHEMICAL COMPOSITION

The following lists include all definitely described mineral species arranged first according to their important basic elements and secondly according to their acid radicals. If a given mineral contains two or more prominent bases its name is repeated in all the appropriate sections.

ALUMINIUM

NOTE: — Aluminium is of such common occurrence among the silicate minerals tnat it is impracticable to list all of these minerals that contain it. Therefore only those silicates which are essentially aluminium minerals are included in the following list.

Chloralluminite, $AlCl_3.6H_2O$.
CRYOLITE, Na_3AlF_6.
Koenenite, Al, Mg, oxychloride.
Fluellite, $AlF_3.H_2O$.
Prosopite, $CaF_2.2Al(F,OH)_3$.
Pachnolite, Thomsenolite, $NaF.CaF_2.AlF_3.H_2O$.
Gearksutite, $CaF_2.Al(F,OH)_3.H_2O$.
Ralstonite, $(Na_2,Mg)F_2.3Al(F,OH)_3.2H_2O$.
Creedite, $2CaF_2.2Al(F,OH)_3.CaSO_4.2H_2O$.
Corundum, Al_2O_3.
Spinel, $MgO.Al_2O_3$.
Hercynite, $FeO.Al_2O_3$.
Gahnite, $ZnO.Al_2O_3$.
Chrysoberyl, $BeO.Al_2O_3$.
Uhligite, $Ca(Ti,Zr)O_5.Al\ (Ti,Al)O_5$.
DIASPORE, $Al_2O_3.H_2O$.
Bauxite, $Al_2O_3.2H_2O$.
GIBBSITE, $Al_2O_3.3H_2O$.
Hydrotalcite, $Al(OH)_3.3Mg(OH)_2.3H_2O$.
Shanyavskite, $Al_2O_3.4H_2O$.
Dundasite, $Pb(AlO)_2(CO_3)_2$.
Dawsonite, $Na_3Al(CO_3)_3.2Al(OH)_3$.
Zunyite, $(Al(OH,F,Cl)_2)_6Al_2Si_3O_{12}$.
Topaz, $[Al(F,OH)]_2SiO_4$.
ANDALUSITE, Al_2SiO_5.
SILLIMANITE, Al_2SiO_5.
Cyanite, Al_2SiO_5.
Dumortierite, $8Al_2O_3.B_2O_3.6SiO_2.H_2O$.
Staurolite, $(AlO)_4(AlOH)Fe(SiO_4)_2$.
Kaolinite, $H_4Al_2Si_2O_9$.
Faratsihite, $(Al,Fe)_2O_3.2SiO_2.2H_2O$.
Halloysite, $H_4Al_2Si_2O_9.H_2O$.
Newtonite, $H_8Al_2Si_2O_{11}.H_2O$.
Cimolite, $2Al_2O_3.9SiO_2.6H_2O$.
Montmorillonite, $H_2Al_2Si_4O_{12}.nH_2O$.

PYROPHYLLITE, $H_2Al_2(SiO_3)_4$.
Allophane, $Al_2SiO_5.5H_2O$.
Melite, $2(Al,Fe)_2O_3.SiO_2.8H_2O$.
Collyrite, $2Al_2O_3.SiO_2.9H_2O$.
Schrötterite, $8Al_2O_3.3SiO_2.30H_2O$.
Hamlinite, Al,Sr, phosphate
Plumbogummite, Pb,Al, phosphate.
Florencite, Al,Ce, phosphate.
Georceixite, $BaO.2Al_2O_3.P_2O_5.5H_2O$.
Crandallite, $2CaO.4Al_2O_3.2P_2O_5.10H_2O$.
Harttite, $(Sr,Ca)O.2Al_2O_3.P_2O_5.SO_3.5H_2O$.
Durangite, $Na(AlF)AsO_4$.
Amblygonite, $Li(AlF)PO_4$
Fremontite, $(Na,Li)Al(OH,F)PO_4$.
Lazulite, $2AlPO_4.(Fe,Mg)(OH)_2$.
Tavistockite, $Ca_3P_2O_3.2Al(OH)_2$.
Cirrolite, $Ca_3Al(PO_4)_3.Al(OH)_3$.
Synadelphite, $2(Al,Mn)AsO_4.5Mn(OH)_2$.
Hematolite, $(Al,Mn)AsO_4.4Mn(OH)_2$.
Barrandite, $(Al,Fe)PO_4.2H_2O$.
Variscite, $AlPO_4.2H_2O$.
Lucinite, $AlPO_4.2H_2O$.
Callainite, $AlPO_4.2\frac{1}{2}H_2O$.
Zepharovichite, $AlPO_4.3H_2O$.
Palmerite, $HK_2Al_2(PO_4)_3.7H_2O$.
Rosiérésite, Hydrous, Al,Pb,Cu, phosphate.
WAVELLITE, $4AlPO_4.2Al(OH)_3.9H_2O$.
Fischerite, $AlPO_4.Al(OH)_3.2\frac{1}{2}H_2O$.
Peganite, $AlPO_4.Al(OH)_3.1\frac{1}{2}H_2O$.
TURQUOIS, $CuO.3Al_2O_3.2P_2O_5.9H_2O$.
Wardite, $2Al_2O_3.P_2O_5.4H_2O$.
Sphærite, $4AlPO_4.6Al(OH)_3$.
Liskeardite, $(Al,Fe)AsO_4.2(Al,Fe)(OH)_3.5H_2O$.
Evansite, $2AlPO_4.4Al(OH)_3.12H_2O$.
Cœruleolactite, $3Al_2O_3.2P_2O_5.10H_2O$.
Angelite, $2Al_2O_3.P_2O_5.3H_2O$.
Berlinite, Trolleite, Attacolite | Hydrous
Minasite, Vashegyite | Alphosphates
Soumansite, Hydrous, Al, Na, fluo-phosphate.
Childrenite, $2AlPO_4.2Fe(OH)_3.2H_2O$.
Eosphorite, $2AlPO_4.2(Mn,Fe)(OH)_3.2H_2O$.
Egueiite, Hydrous, Fe,Al,Ca, phosphate.
Liroconite, $Cu_6Al(AsO_4)_5.3CuAl(OH)_6.20H_2O$.
Henwoodite, Al,Cu, hydrous phosphate.
Ceruleite, $CuO.2Al_2O_3.As_2O_5.8H_2O$.
Kehoite, Hydrous, Al,Zn, phosphate.
Goyazite, $Ca_3Al_{10}P_2O_{23}.9H_2O$.
Roschérite, $(Mn,Fe,Ca)_2Al(OH)(PO_4)_2.2H_2O$.
Svanbergite, Hydrous Al, Ca, phosphate and sulphate.
Teremejevite, $AlBO_3$.
Rhodizite, Al,K, borate.
Millosevichite, $(Fe,Al)_2(SO_4)_3$.
Spangolite, $Cu_6AlClSO_{10}.9H_2O$.
Alumian, $Al_2O_3.2SO_3$.
Kalinite, $KAl(SO_4)_2.12H_2O$.
Tschermigite, $(NH_4)Al(SO_4)_2.12H_2O$.
Mendozite, $NaAl(SO_4)_2.12H_2O$.
Pickeringite, $MgSO_4.Al_2(SO_4)_3.22H_2O$.
Halotrichite, $FeSO_4.Al_2(SO_4)_3.24H_2O$.
Apjohnite, $MnSO_4.Al_2(SO_4)_3.24H_2O$.
Dietrichite, $(Zn,Fe,Mn)SO_4.Al_2(SO_4)H_3.22_2O$.
Alunogen, $Al_2(SO_4)_3.18H_2O$.
Cyanotrichite, $4CuO.Al_2O_3.SO_3.8H_2O$.
Knoxvillite, Hydrous, Fe,Al,Cr, sulphate.
Cyprusite, $7Fe_2O_3.Al_2O_3.10SO_3.14H_2O$.
Aluminite, $Al_2O_3.SO_3.9H_2O$.
Paraluminite, $2Al_2O_3.SO_3.10H_2O$.
Felsöbanyite, $2Al_2O_3.SO_3.10H_2O$.
Voltaite, $3(K_2,Fe)O.2(Al,Fe)_2O_3.6SO_3.9H_2O$.
ALUNITE, $K_2Al_6(OH)_{12}.(SO_4)_4$.
Löwigite, $K_2O.3Al_2O_3.4SO_3.9H_2O$.
Almeriite, $Na_2SO_4.Al_2(SO_4)_3.5Al(OH)_3.H_2O$.
Ettringite, $6CaO.Al_2O_3.3SO_3.33H_2O$.
Zincaluminite, $2ZnSO_4.4Zn(OH)_2.6Al(OH)_3.5H_2O$.
Mellite, $Al_2C_{12}O_{12}.18H_2O$.

ANTIMONY

NOTE: — The antimonates are not included in this list.

Allemontite, $SbAs_3$.
NATIVE ANTIMONY, Sb.
Stibnite, Sb_2S_3.
Kermesite, Sb_2S_2O.
Senarmontite, Valentinite, Sb_2O_3.
Cervantite, $Sb_2O_3.Sb_2O_5$.
Stibiconite, $H_2Sb_2O_5$.
Stibiotantalite, $(SbO)_2(Ta,Nb)_2O_6$.

ARSENIC

NOTE: — The arsenates are not included in this list.

NATIVE ARSENIC, As.
Allemontite, $SbAs_3$.
REALGAR, AsS.
ORPIMENT, As_2S_3.
Arsenopyrite, FeAsS.
Arsenolite, Claudetite, As_2O_3.

BARIUM

Witherite, $BaCO_3$.
Bromlite, $(Ba,Ca)CO_3$.
Barytocalcite, $BaCO_3.CaCO_3$.
Hyalophane, $(K_2,Ba)Al_2(SiO_3)_4$.
Celsian, $BaAl_2Si_2O_8$.
Cappelenite, Y,Ba, boro-silicate.
Hyalotekite, $(Pb,Ba,Ca)B_2(SiO_3)_{12}$.
Barylite, $Ba_4Al_4Si_7O_{24}$.
Taramellite, $Ba_4Fe'' Fe_4''' Si_{10}O_{31}$.
Brewsterite, $H_4(Sr,Ba,Ca)Al_2(SiO_3)_8.3H_2O$.
Wellsite, $(Ba,Ca,K_2)Al_2Si_3O_{10}.3H_2O$.
Harmotone, $(K_2,Ba)Al_2Si_5O_{14}.5H_2O$.
Edingtonite, $BaAl_2Si_3O_{10}.3H_2O$.
Benitoite, $BaTiSi_3O_9$.
Leucosphenite, $Na_4Ba(TiO)_2(Si_2O_5)_5$.
Georceixite, $BaO.2Al_2O_3.P_2O_5.5H_2O$.
Ferrazite, $3(Ba,Pb)O.2P_2O_5.8H_2O$.
Volborthite, Cu,Ba,Ca, vanadate.
Uranocircite, $Ba(UO_2)_2P_2O_8.8H_2O$.
Nitrobarite, $Ba(NO_3)_2$.
Barite, $BaSO_4$.

BERYLLIUM

Chrysoberyl, $BeAl_2O_4$.
Eudidymite, Epididymite, $HNaBeSi_3O_8$.
Beryl, $Be_3Al_2(SiO_3)_6$.
Leucophanite / Meliphanite } Be,Ca,Na, silicates.
Helvite, $(Be,Mn,Fe)_7Si_3O_{12}S$.
Danalite, $(Be,Fe,Zn,Mn)_7Si_3O_{12}S$.
Phenacite, Be_2SiO_4.
Trimerite, $(Mn,Ca)_2SiO_4.Be_2SiO_4$.
Euclase, $HBeAlSiO_5$.
Gadolinite, $Be_2FeY_2Si_2O_{10}$.
Bertrandite, $H_2Be_4Si_2O_9$.
Beryllonite, $NaBePO_4$.
Herderite, $Ca[Be(F,OH)]PO_4$.
Hambergite, $Be_2(OH)BO_3$.

BISMUTH

Native Bismuth, Bi.
Bismuthinite, Bi_2S_3.
Guanajuatite, Bi_2Se_3.
Tetradymite, $Bi_2(Te,S)_3$.
Grünlingite, Bi_4TeS_3.
Joséite, Wehrlite, bismuth tellurides.
Daubreete, Bi, oxychloride.
Bismite, Bi_2O_3.
Bismutospärite, $Bi_2(CO_3)_3.2Bi_2O_3$.
Bismutite, $Bi_2O_3.CO_2.H_2O$.
Eulytite, Agricolite, $Bi_4Si_3O_{12}$.
Pucherite, $BiVO_4$.
Atelestite, $H_2Bi_3AsO_8$.
Walpurgite, $Bi_{10}(UO_2)_3(OH)_{24}(AsO_4)_4$.
Rhagite, $2BiAsO_4.3Bi(OH)_3$.
Arseno-bismite, hydrous Bi arsenate.
Mixite, Hydrous Cu, Bi, arsenate.
Uranosphærite, $(BiO)_2U_2O_7.3H_2O$.
Montanite, $Bi_2O_3.TeO_3.2H_2O$.
Koechlinite, $Bi_2O_3.MoO_3$.

BORON

Note: — The borates are not included in this list.

Sassolite, $B(OH)_3$.
Cappelenite, Y,Ba, boro-silicate.
Hyalotekite, $(Pb,Ba,Ca)B_2(SiO_3)_{12}$.
Danburite, $CaB_2(SiO_4)_2$.
Datolite, $HCaBSiO_5$.
Homilite, $Ca_2FeB_2Si_2O_{10}$.
Axinite, Ca,Al, boro-silicate.
Tourmaline, complex boro-silicate.
Dumortierite, $8Al_2O_3.B_2O_3.6SiO_2.H_2O$.
Serendibite, $10(Ca,Mg)O.5Al_2O_3.B_2O_3.6SiO_2$.
Manandonite, $H_4Li_4Al_4B_4Si_6O_{53}$.
Bakerite, Hydrous Ca, boro-silicate.
Searlesite, $NaB(SiO_3)_2.H_2O$.
Lüneburgite, $3MgO.B_2O_3.P_2O_5.8H_2O$.

CADMIUM

Greenockite, CdS.
Cadmiumoxide, CdO.
Otavite, Cd carbonate.

CÆSIUM

Pollucite, $2Cs_2O.2Al_2O_3.9SiO_2.H_2O$.
Rhodizite, Al,K,Cs, borate.

CALCIUM

Oldhamite, CaS.
Fluorite, CaF_2.
Hydrophilite, $CaCl_2$.
Yttrofluorite, $(Ca_3,Y_2)F_6$.
Nocerite, $2(Ca,Mg)F_2.(Ca,Mg)O$.
Tachhydrite, $CaCl_2.2MgCl_2.12H_2O$.
Prosopite, $CaF_2.2Al(F.OH)_3$.
Pachnolite, Thomsenolite, $NaF.CaF_2.AlF_3.H_2O$.
Gearksutite, $CaF_2.Al(F,OH)_3.H_2O$.
Creedite, $2CaF_2.2Al(F,OH)_3.CaSO_4.2H_2O$.
Yttrocerite, $(Y,Er,Ce)F_3.5CaF_2.H_2O$.
Uhligite, $Ca(Ti,Zr)O_5.Al(Ti,Al)O_5$.
Calcite, $CaCO_3$.
Dolomite, $CaCO_3.MgCO_3$.
Ankerite, $CaCO_3.(Mg,Fe,Mn)CO_3$.
Aragonite, $CaCO_3$.
Bromlite, $(Ba,Ca)CO_3$.
Barytocalcite, $BaCO_3.CaCO_3$.
Parisite, $[(Ce,La,Di)F]_2Ca(CO_3)_2$.
Pirssonite, $CaCO_3.Na_2CO_3.2H_2O$.
Gay-Lussite, $CaCO_3.Na_2CO_3.5H_2O$.
Gajite, basic, hydrous, Ca, Mg, carbonate.
Uranothallite, $2CaCO_3.U(CO_3)_2.10H_2O$.
Liebigite, Hydrous Ca,U, carbonate.
Voglite, Hydrous U,Ca,Cu, carbonate.
Milarite, $HKCa_2Al_2(Si_2O_5)_6$.
Rivaite, $(Ca,Na_2)Si_2O_5$.
Oligoclase / **Andesine** / **Labradorite** } Mixtures of $NaAlSi_3O_8$ and $CaAl_2Si_2O_8$.
Anorthite, $CaAl_2Si_2O_8$.
Anemousite, $Na_2O.2CaO.3Al_2O_3.9SiO_2$.
Pyroxene, Ca,Mg, etc., silicate.
Wollastonite, $CaSiO_3$.
Pectolite, $HNaCa_2(SiO_3)_3$.
Schizolite, $HNa(Ca,Mn)_2(SiO_3)_3$.
Rosenbuschite, near pectolite with Zr.
Wöhlerite, Zr-silicate and niobate of Ca,Na.
Låvenite, Zr-silicate of Mn,Ca.
Babingtonite, $(Ca,Fe,Mn)SiO_3$ with $Fe_2(SiO_3)_3$.
Hiortdahlite, $(Na_2,Ca)(Si,Zr)O_3$.
Amphibole, Ca, Mg, etc., silicate.
Arfvedsonite, Na,Ca,Fe, silicate.
Leucophanite / Meliphanite } Na,Be,Ca, fluo-silicate.
Custerite, $Ca_2(OH,F)SiO_3$.
Didymolite, $2CaO.3Al_2O_3.9SiO_2$.
Ganomalite, $Pb_4(PbOH)_2Ca_4(Si_2O_7)_3$.
Nasonite, $Pb_4(PbCl)_2Ca_4(Si_2O_7)_3$.
Margarosanite, $Pb(Ca,Mn)_2(SiO_3)_3$.
Hardystonite, $Ca_2ZnSi_2O_7$.
Rocblingite, $5(H_2CaSiO_4).2(CaPbSO_4)$.
Haüynite, $Na_2Ca(NaSO_4.Al)Al_2(SiO_4)_3$.
Grossularite, $Ca_3Al_2(SiO_4)_3$.
Andradite, $Ca_3Fe_2(SiO_4)_3$.

UVAROVITE, $Ca_3Cr_2(SiO_4)_3$.
Schorlomite, $Ca_3(Fe,Ti_2)[(Si,Ti)O_{43}]$.
Monticellite, $CaMgSiO_4$.
Glaucochroite, $CaMnSiO_4$.
Trimerite, $(Mn,Ca)_2SiO_4.Be_2SiO_4$.
SCAPOLITE GROUP, Mixtures of $Ca_4Al_6Si_6O_{25}$ and $Na_4Al_3Si_9O_{24}Cl$.
Sarcolite, $(Ca,Na_2)_3Al_2(SiO_4)_3$.
Melilite, $Na_2(Ca,Mg)_{11}(Al,Fe)_4(SiO_4)_9$.
Cebollite, $H_2Ca_5Al_2Si_3O_{16}$.
Gehlenite, $Ca_3Al_2Si_2O_{10}$.
Vesuvianite, $Ca_6[Al(OH,F)]Al_2(SiO_4)_5$.
DANBURITE, $CaB_2(SiO_4)_2$.
Guarinite, $2(K,Na)_2O.8CaO.5(Al,Fe,Ce)_2O_3.10SiO_2$.
Datolite, $HCaBSiO_5$.
Homilite, $Ca_2FeB_2Si_2O_{10}$.
ZOISITE, $Ca_2(AlOH)Al_2(SiO_4)_3$.
Epidote, $Ca_2[(Al,Fe)OH](Al,Fe)_2(SiO_4)_3$.
Piedmontite, $Ca_2(AlOH)(Al,Mn)_2(SiO_4)_3$.
Allanite, $(Ca,Fe)_2(AlOH)(Al,Ce,Fe)_2(SiO_4)_3$.
AXINITE, Ca,Al, boro-silicate.
PREHNITE, $H_2Ca_2Al_2(SiO_4)_3$.
Harstigite, Mn,Ca, silicate
Cuspidine, $Ca_2Si(O,F_2)_4$.
ILVAITE, $CaFe_3(FeOH)(SiO_4)_2$.
Clinohedrite, $H_2CaZnSiO_5$.
Stokesite, $H_4CaSnSi_3O_{11}$.
Lawsonite, Hibschite, $H_4CaAl_2Si_2O_{10}$.
Beckelite, $Ca_3(Ce,La,Di)_4Si_3O_{15}$.
Angaralite, $2(Ca,Mg)0.5(Al.Fe)_2O_3.6SiO_2$.
Serendibite, $10(Ca,Mg)O.5Al_2O_3.B_2O_3.6SiO_2$.
Silicomagnesiofluorite, $H_2Ca_4Mg_3Si_2O_7F_{10}$.
Grothine, Ca,Al, silicate.
Aloisite, Fe,Ca,Mg,Na, silicate.
Inesite, $H_2(Mn,Ca)_6Si_6O_{19}.3H_2O$.
Hillebrandite, $Ca_2SiO_4.H_2O$.
Crestmoreite, $4H_2CaSiO_4.3H_2O$.
Riversideite, $2CaSiO_5.H_2O$.
Lotrite, $3(Ca,Mg)O.2(Al,Fe)_2O_3.4SiO_2.2H_2O$
Okenite, $H_2CaSi_2O_5.H_2O$.
Gyrolite, $H_2Ca_2Si_3O_9.H_2O$.
APOPHYLLITE, $H_7KCa_4(SiO_3)_8.4\frac{1}{2}H_2O$.
Ptilolite, $(Ca,K_2,Na_2)Al_2Si_{10}O_{24}.5H_2O$.
Mordenite, $(Ca,K_2,Na_2)Al_2Si_{10}O_{24}.20H_2O$.
HEULANDITE, $H_4CaAl_2(SiO_3)_6.3H_2O$.
Brewsterite, $H_4(Sr,Ba,Ca)Al_2(SiO_3)_6.3H_2O$.
Epistilbite, $H_4CaAl_2(SiO_3)_6.3H_2O$.
Wellsite, $(Ba,Ca,K_2)Al_2Si_3O_{10}.3H_2O$.
Phillipsite, $(K_2,Ca)Al_2Si_4O_{12}.4\frac{1}{2}H_2O$.
Stilbite, $(Na_2,Ca)Al_2Si_6O_{16}.6H_2O$.
Flokite, $H_8(Ca,Na_2)Al_2Si_9O_{26}.2H_2O$.
Gismondite, $CaAl_2Si_2O_8.4H_2O$.
Laumontite, $H_4CaAl_2Si_4O_{14}.2H_2O$.
Laubanite, $Ca_2Al_2Si_5O_{15}.6H_2O$.
CHABAZITE, $(Ca,Na_2)Al_2Si_4O_{12}.6H_2O$.
Gmelinite, $(Na_2,Ca)Al_2Si_4O_{12}.6H_2O$.
Levynite, $CaAl_2Si_3O_{10}.5H_2O$.
Faujasite, $H_4Na_2CaAl_4Si_{10}O_{28}.18H_2O$.
Scolecite, $Ca(AlOH)_3(SiO_3)_3.2H_2O$.
Mesolite, $Na_2Al_2Si_3O_{10}.2H_2O+2[CaAl_2Si_3O_{10}.3H_2O]$.
Gonnardite, $(Ca,Na_2)_2Al_2Si_5O_{15}.5\frac{1}{2}H_2O$.
Thomsonite, $(Na_2,Ca)Al_2Si_2O_8.2\frac{1}{2}H_2O$.
Hydrothomsonite, $(H_2,Na_2,Ca)Al_2Si_2O_8.5H_2O$.
Arduinite, Ca,Na, zeolite.
Echellite, $(Ca,Na_2)O.2Al_2O_3.3SiO_2.4H_2O$.
Epidesmine, $(Na_2,Ca)Al_2Si_6O_{16}.6H_2O$.
Stellerite, $CaAl_2Si_7O_{18}.7H_2O$.
Erionite, $H_2CaK_2Na_2Al_2Si_6O_{17}.5H_2O$.
Bavenite, $Ca_3Al_2(SiO_3)_6.H_2O$.
Bityite, Hydrous, Ca,Al, silicate.
Margarite, $H_2CaAl_4Si_2O_{12}$.
Seybertite, $H_3(Mg,Ca)_5Al_5Si_2O_{18}$.
Xanthophyllite, $H_3(Mg,Ca)_{14}Al_{16}Si_5O_{52}$.
Griffithite, $4(Mg,Fe,Ca)O(Al,Fe)_2O_3.5SiO_2.7H_2O$.
Cenosite, $H_4Ca_2(Y,Er)_2CSi_4O_{17}$.
Plazolite, $3CaO.Al_2O_3.2(SiO_2,CO_2).2H_2O$.
Thaumasite, $CaSiO_3.CaCO_3.CaSO_4.15H_2O$.
Spurrite, $2Ca_2SiO_4.CaCO_3$.
Uranophane, $CaO.2UO_3.2SiO_2.6H_2O$.
Bakerite, Hydrous Ca boro-silicate.
TINANITE, $CaTiSiO_5$.
Molengraafite, Ca,Na, titano-silicate.
Keilhauite, Ca,Al,Fe,Y, titano-silicate.
Joaquinite, Ca,Fe, titano-silicate.
Perovskite, $CaTiO_3$.
Dysanalyte, Ca,Fe, titano-niobate.
Pyrochlore, Ca,Ce, niobate.
Koppite, Ca,Ce,niobate
Chalcolamprite, $\overset{II}{R}Nb_2O_6F_2.\overset{II}{R}SiO_3$.
Microlite, $Ca_2Ta_2O_7$.
Berzeliite, $(Ca,Mg,Mn,Na_2)_3As_2O_8$.
Graftonite, $(Fe,Mn,Ca)_3P_2O_8$.
Apatite, $Ca_4(CaF)(PO_4)_3$.
Fermorite, $(Ca,Sr)_4[Ca(OH,F)][(P,As)O_4]_3$.
Wilkeite, $3Ca_3(PO_4)_2.CaCO_3.3Ca_3[(SiO_4)(SO_4)].CaO$.
Svabite, Ca arsenate.
Spodiosite, $(CaF)CaPO_4$.
Adelite $(MgOH)CaAsO_4$.
Tilasite $(MgF)CaAsO_4$.
Herderite, $Ca[Be(F,OH)]PO_4$.
Ježekite, $Na_4CaAl(AlO)(F,OH)_4(PO_4)_2$.
Crandallite, $2CaO.4Al_2O_3.2P_2O_5.10H_2O$.
Lacroixite, $Na_4(Ca,Mn)_4Al_3(F,OH)_4P_3O_{16}.2H_2O$.
Calciovolborthite, $(Cu,Ca)_3V_2O_8.(Cu,Ca)(OH)_2$.
Tavistockite, $Ca_3P_2O_8.2Al(OH)_2$.
Cirrolite, $Ca_3Al(PO_4)_3.Al(OH)_3$.
Arseniosiderite, $Ca_3Fe(AsO_4)_3.3Fe(OH)_3$.
Retzian, Y,Mn,Ca, arsenate.
Arseniopleite, $(Mn,Ca)_9(Mn,Fe)_2(OH)_6(AsO_4)_6$.
Collophanite, $Ca_3P_2O_8.H_2O$.
Pyrophosphorite, $Mg_2P_2O_7.4(Ca_3P_2O_8.Ca_2P_2O_7)$.
Roselite, $(Ca,Co,Mg)_3As_2O_8.2H_2O$.
Brandite, $Ca_2MnAs_2O_8.2H_2O$.
Fairfieldite, $Ca_2MnP_2O_8.2H_2O$.
Messelite, $(Ca,Fe)_3P_2O_8.2\frac{1}{2}H_2O$.
Anapaite, $(Ca,Fe)_3P_2O_8.4H_2O$.

Picropharmacolite, $(Ca,Mg)As_2O_8.6H_2O$.
Churchite, Hydrous Ca,Ce, phosphate.
Fernandinite, $CaO.V_2O_4.5V_2O_5.14H_2O$.
Pascoite, $2CaO.3V_2O_5.11H_2O$.
Pintadoite, $2CaO.V_2O_5.9H_2O$.
Pharmacolite, $HCaAsO_4.2H_2O$.
Haidingerite, $HCaAsO_4.H_2O$.
Wapplerite, $HCaAsO_4.3\frac{1}{2}H_2O$.
Brushite, $HCaPO_4.2H_2O$.
Martinite, $H_2Ca_5(PO_4)_4.\frac{1}{2}H_2O$.
Hewettite, Metahewettite } $CaO.3V_2O_5.9H_2O$.
Isoclasite, $Ca_3P_2O_8.Ca(OH)_2.4H_2O$.
Conichalcite, $(Cu,Ca)_3As_2O_8.(Cu,Ca)(OH)_2.\frac{1}{2}H_2O$.
Volborthite, Cu,Ba,Ca, vanadate.
Mazapilite, $Ca_3Fe_2(AsO_4)_4.2FeO(OH).5H_2O$.
Yukonite, $(Ca_3,Fe_2''')(AsO_4)_2.2Fe(OH)_3.5H_2O$.
Calcioferrite, $Ca_3Fe_2(PO_4)_4.Fe(OH)_3.8H_2O$.
Borickite, $Ca_3Fe_2(PO_4)_4.12Fe(OH)_3.6H_2O$.
Egueiite, Hydrous Fe,Al,Ca, phosphate.
Goyazite, $Ca_3Al_{10}P_2O_{23}.9H_2O$.
Roschérite, $(Mn,Fe,Ca)_2Al(OH)(PO_4)_2.2H_2O$.
Autunite, Bassetite } $Ca(UO_2)_2P_2O_8.8H_2O$.
Uranospinite, $Ca(UO_2)_2As_2O_8.8H_2O$.
Tyuyamunite, $CaO.2UO_3.V_2O_5.4H_2O$.
Romeite, $CaSb_2O_4$.
Lewisite, $5CaO.2TiO_2.3Sb_2O_5$.
Mauzeliite, Pb,Ca, titano-antimonate.
Podolite, $3Ca_3(PO_4)_2.CaCO_3$.
Svanbergite, Hydrous Al,Ca, phosphate and sulphate.
Nitrocalcite, $Ca(NO_3)_2.nH_2O$.
Lautarite, $Ca(IO_3)_2$.
Dietzeite, Ca iodo-chromate.
Nordenskiöldine, $CaSn(BO_3)_2$.
Howlite, $H_5Ca_2B_5SiO_{14}$.
Colemanite, $Ca_2B_6O_{11}.5H_2O$.
Inyoite, $2CaO.3B_2O_3.13H_2O$.
Meyerhofferite, $2CaO.3B_2O_3.7H_2O$.
Ulexite, $NaCaB_5O_9.8H_2O$.
Bechilite, $CaB_4O_7.4H_2O$.
Hydroboracite, $CaMgB_6O_{11}.6H_2O$.
Glauberite, $Na_2SO_4.CaSO_4$.
Anhydrite, Bassanite } $CaSO_4$.
Gypsum, $CaSO_4.2H_2O$.
Syngenite, $CaSO_4.K_2SO_4.H_2O$.
Polyhalite, $2CaSO_4.MgSO_4.K_2SO_4.2H_2O$.
Ettringite, $6CaO.Al_2O_3.3SO_3.33H_2O$.
Uranopilite, $CaU_3S_2O_{31}.25H_2O$.
Scheelite, $CaWO_4$.
Powellite, $Ca(Mo,W)O_4$.
Whewellite, $CaC_2O_4.H_2O$.

CERIUM EARTHS

Tysonite, $(Ce,La,Di)F_3$.
Fluocerite, $(Ce,La,Di)_2OF_4$.
Yttrocerite, $(Y,Er,Ce)F_3.5CaF_2.H_2O$.
Parisite, $[(Ce,La,Di)F]_2.CaCO_3$.
Bastnäsite, $(CeF)CO_3$.
Ancylite, $4Ce(OH)CO_3.3SrCO_3.3H_2O$.
Ambatoarinite, Rare earths, Sr, carbonate.
Lanthanite, $La_2(CO_3)_3.9H_2O$.
Melanocerite, Caryocerite, Steenstrupine } Ca,Ce,Y, fluo-silicates.
Tritomite, Th,Ce,Y,Ca, fluo-silicate.
Mackintoshite, U,Th,Ce, silicate.
Allanite, Ca,Fe,Ce,Al, silicate.
Cerite, Ce, etc., silicate.
Beckelite, $Ca_3(Ce,La,Di)_4Si_3O_{15}$.
Hellandite, Ce, etc., Al,Mn,Ca, silicate.
Bazzite, Sc., etc., silicate.
Britholite, Ce, etc., silicate and phosphate.
Erikite, Ce, etc., silicate and phosphate.
Tscheffkinite, Ce,Fe, titano-silicate.
Johnstrupite, Mosandrite, Rinkite } Ce, etc., titano-silicates.
Knopite, Ca,Ce, titanate.
Pyrochlore, Ca,Ce, niobate.
Chalcolamprite, $R''Nb_2O_6F_2.R''SiO_3$.
Koppite, Ca,Ce, niobate.
Fergusonite, Y,Er,Ce,U, niobate.
Sipylite, Er,Ce, niobate.
Yttrotantalite, Fe,Ca,Y,Er,Ce, tantalate.
Samarskite, Fe,Ca,U,Ce,Y, niobate.
Aeschynite, Ce, niobate-titanate.
Polymignite, Ce, Fe, Ca, niobate-titanate.
Euxenite, Polycrase, Blomstrandine-Priorite } Y,Ce,U, niobate-titanates.
Monazite, $(Ce,La,Di)PO_4$.
Florencite, Ce,Al, phosphate.
Rhabdophanite, Hydrous Ce,Y, phosphate.
Churchite, Hydrous Ce,Ca, phosphate.

CHROMIUM

Daubréelite, $FeS.Cr_2S_3$.
Chromite, $FeO.Cr_2O_3$.
Stichtite, $2MgCO_3.5Mg(OH)_2.2Cr(OH)_3$.
Uvarovite, $Ca_3Cr_2(SiO_4)_3$.
Furnacite, Pb,Cu, chrom-arsenate.
Dietzite, Ca iodo-chromate.
Crocoite, $PbCrO_4$.
Phœnicochroite, $3PbO.2CrO_3$.
Vauquelinite, $2(Pb,Cu)CrO_4.(Pb,Cu)_3P_2O_8$.
Bellite, Pb, arseno-chromate.
Knoxvillite, Hydrous Fe,Al,Cr, sulphate.
Redingtonite, Hydrous Cr sulphate.

COBALT

Sychnodymite, $(Co,Cu)_4S_5$.
Linnæite, Co_3S_4.
Carrollite, $CuCo_2S_4$.
Badenite, $(Co,Ni,Fe)_2(As,Bi)_3$.
Cobaltnickelpyrite, $(Co,Ni,Fe)S_2$.
Smaltite, $CoAs_2$.
Cobaltite, $CoAsS$.
Willyamite, $CoS_2.NiS_2.CoSb_2.NiSb_2$.
Villamaninite, Cu,Ni,Co,Fe, sulphide.

Skutterudite, $CoAs_3$.
Safflorite, $CoAs_2$.
Glaucodot, (Co,Fe)AsS.
Sphærocobaltite, $CoCO_3$.
Remingtonite, Hydrous, carbonate.
Roselite, $(Ca,Co,Mg)_3As_2O_8.2H_2O$.
Erythrite, $Co_3As_2O_8.8H_2O$.
Forbesite, $H_2(Ni,Co)_2As_2O_8.8H_2O$.
Bieberite, $CoSO_4.7H_2O$.

COPPER

Native Copper, Cu.
Horsfordite, Cu_6Sb.
Domeykite, Cu_3As.
Mohawkite, Cu_3As.
Algodonite, Cu_6As.
Whitneyite, Cu_9As.
Cocinerite, Cu_4AgS.
Rickardite, Cu_4Te_3.
Berzelianite, Cu_2Se.
Eucairite, $Cu_2Se.Ag_2Se$.
Zorgite, Pb,Cu, selenide.
Crookesite, Cu,Tl, selenide.
Umangite, $CuSe.Cu_2Se$.
Chalcocite, Cu_2S.
Stromeyrite, $(Ag,Cu)_2S$.
Chalmersite, $Cu_2S.Fe_4S_5$.
COVELLITE, CuS.
Sychnodymite, $(Co,Cu)_4S_5$.
Bornite, Cu_5FeS_4.
Carrollite, $CuS.Co_2S_3$.
Chalcopyrite, $CuFeS_2$.
Villamaninite, Cu,Ni,Co,Fe, sulphide.
Eichbergite, $(Cu,Fe)_2S.3(Bi,Sb)_2S_3$.
Histrixite, $5CuFeS_2.2Sb_2S_3.7Bi_2S_3$.
Cuprobismutite, $3Cu_2S.4Bi_2S_3$.
Emplectite, $Cu_2S.Bi_2S_3$.
Chalcostibite, $Cu_2S.Sb_2S_3$.
Hutchinsonite, $(Tl,Ag,Cu)_2S.As_2S_3 + PbS.As_2S_3$?
Klaprotholite, $3Cu_2S.Bi_2S_3$.
Bournonite, $3(Pb,Cu_2)S.Sb_2S_3$.
Seligmannite, $3(Pb,Cu_2)S.As_2S_3$.
Aikinite, $2PbS.Cu_2S.Bi_2S_3$.
Wittichenite, $3Cu_2S.Bi_2S_3$.
Stylotypite, $3(Cu_2,Ag_2,Fe)S.Sb_2S_3$.
Lengenbachite, $7[Pb,(Ag,Cu)_2]S.2As_2S_3$.
Falkenhaynite, $3Cu_2S.Sb_2S_3$.
Tetrahedrite, $4Cu_2S.Sb_2S_3$.
TENNANTITE, $4Cu_2S.As_2S_3$.
Goldfieldite, $5Cu_2S.(Sb,As,Bi)_2(S.Te)_3$.
Enargite, $3Cu_2S.As_2S_5$.
Famatinite, $3Cu_2S.Sb_2S_5$.
Sulvanite, $3Cu_2S.V_2S_5$.
Epigenite, $4Cu_2S.3FeS.As_2S_5$.
STANNITE, $Cu_2S.FeS.SnS_2$.
Nantokite, CuCl.
Marshite, CuI.
Miersite, 4AgI.CuI.
ATACAMITE, $CuCl_2.3Cu(OH)_2$.
Percylite, $PbCl_2.CuO.H_2O$.
Boleite, $9PbCl_2.8CuO.3AgCl.9H_2O$.
Pseudoboleite, $5PbCl_2.4CuO.6H_2O$.
Cumengite, $4PbCl_2.4CuO.5H_2O$.
Tallingite, Hydrous Cu chloride.
Cuprite, Cu_2O.
Tenorite, Paramelaconite, CuO.
Crednerite, $3CuO.2Zn_2O_3$.
Rosasite, $2CuO.3CuCO_3.5ZnCO_3$?
Malachite, $CuCO_3.Cu(OH)_2$.
Azurite, $2CuCO_3.Cu(OH)_2$.
Aurichalcite, $2(Zn,Cu)CO_3.3(Zn,Cu)(OH)_2$.
Voglite, Hydrous U,Ca,Cu, carbonate.
Dioptase, H_2CuSiO_4.
Planchéite, $H_4Cu_7(Cu.OH)_8(SiO_3)_{12}$.
CHRYSOCOLLA, $CuSiO_3.2H_2O$.
Shattuckite, $2CuSiO_3.H_2O$.
Bisbeeite, $CuSiO_3.H_2O$
Olivenite, $Cu_2(OH)AsO_4$.
Libethenite, $Cu_2(OH)PO_4$.
Calciovolborthite, $(Cu,Ca)_3V_2O_8.(Cu,Ca)(OH)_2$.
Turanite, $5CuO.V_2O_5.2H_2O$.
Psittacinite } Pb,Cu, vanadates.
Mottramite }
Furnceite, Pb,Cu, chrom-arsenate.
Tsumebite, Pb,Cu, phosphate.
Clinoclasite, $Cu_3As_2O_8.3Cu(OH)_2$.
Erinite, $Cu_3As_2O_8.2Cu(OH)_2$.
Dihydrite, $Cu_3P_2O_8.2Cu(OH)_2$.
Pseudomalachite, $Cu_3P_2O_8.3Cu(OH)_2$.
Trichalcite, $Cu_3As_2O_8.5H_2O$.
Rosiérésite, Hydrous Al,Pb,Cu, phosphate.
Eucroite, $Cu_3As_2O_8.Cu(OH)_2.6H_2O$.
Conichalcite, $(Cu,Ca)_3As_2O_8.(Cu,Ca)(OH)_2.\frac{1}{2}H_2O$.
Bayldonite, $(Pb,Cu)_3As_2O_8.(Pb,Cu)(OH)_2.H_2O$.
Tagilite, $Cu_3P_2O_8.Cu(OH)_2.2H_2O$.
Leucochalcite, $Cu_3As_2O_8.Cu(OH)_2.2H_2O$.
Barthite, $3ZnO.CuO.3As_2O_5.2H_2O$.
Volborthite, Hydrous, Cu,Ba,Ca, vanadate.
Cornwallite, $Cu_3As_2O_8.2Cu(OH)_2.H_2O$.
Tyrolite, $Cu_3As_2O_8.2Cu(OH)_2.7H_2O$.
Chalcophyllite, $7CuO.As_2O_5.14H_2O$.
Veszelyite, Hydrous Cu,Zn, phospho-arsenate.
Turquois, $CuO.3Al_2O_3.2P_2O_5.9H_2O$.
Liroconite, $Cu_6Al(AsO_4)_5.3CuAl(OH)_5.20H_2O$
Chenevixite, $Cu_2(FeO)_2As_2O_8.3H_2O$.
Henwoodite, Al,Cu, hydrous phosphate.
Ceruleite, $CuO.2Al_2O_3.As_2O_5.8H_2O$.
Chalcosiderite, $CuO.2Fe_2O_3.2P_2O_5.8H_2O$.
Torbernite, $Cu(UO_2)_2P_2O_8.8H_2O$.
Zeunerite, $Cu(UO_2)_2As_2O_8.8H_2O$.
Mixite, Hydrous Cu,Bi, arsenate.
Trippkeite, Cu, arsenite.
Lindackerite, $3NiO.6CuO.SO_3.2As_2O_5.7H_2O$.
Gerhardtite, $Cu(NO_3)_2.3Cu(OH)_2$.
Hydrocyanite, $CuSO_4$.
Vauquelinite, $2(Pb,Cu)CrO_4.(Pb,Cu)_3P_2O_8$.
Connellite, $CuSO_4.2CuCl_2.19Cu(OH)_2.H_2O$.
Spangolite, $Cu_6AlClSO_{10}.9H_2O$.
BROCHANTITE, $CuSO_4.3Cu(OH)_2$.
Dolerophanite, Cu_2SO_5.
Caledonite, $2(Pb,Cu)O.SO_3.H_2O$.

Linarite, $(Pb,Cu)SO_4.(Pb,Cu)(OH)_2$.
Anthrite, $CuSO_4.2Cu(OH)_2$.
Pisanite, $(Fe,Cu)SO_4.7H_2O$.
Boothite, $CuSO_4.7H_2O$.
Cupromagnesite, $(Cu,Mg)SO_4.7H_2O$.
CHALCANTHITE, $CuSO_4.5H_2O$.
Kröhnkite, $CuSO_4.Na_2SO_4.2H_2O$.
Natrochalcite, $Cu_4(OH)_2(SO_4)_2.Na_2SO_4.2H_2O$
Phillipite, $CuSO_4.Fe_2(SO_4)_3.nH_2O$.
Langite, $CuSO_4.3Cu(OH)_2.H_2O$.
Herrengrundite, $2(CuOH)_2SO_4.Cu(OH)_2$.
Vernadskite, $3CuSO_4.Cu(OH)_2.4H_2O$.
Kamarezite, Hydrous basic Cu sulphate.
Cyanotrichite, $4CuO.Al_2O_3.SO_3.8H_2O$.
Serpierite, Hydrous basic Cu,Zn, sulphate.
Beaverite, $CuO.PbO.Fe_2O_3.2SO_3.4H_2O$.
Johannite, Hydrous Cu,U, sulphate.
Gilpinite, $(Cu,Fe,Na_2)O.UO_3.SO_3.4H_2O$.
Chalcomenite, $CuSeO_3.2H_2O$.
Cuprotiungstite, $CuWO_4$.

GOLD

Native Gold, Au.
Petzite, $(Ag,Au)_2Te$.
SYLVANITE, $(Au,Ag)Te_2$.
Krennerite, $(Au,Ag)Te_2$.
CALAVERITE, $AuTe_2$.
Muthmannite, (Ag,Au)Te.
Nagyagite, Au,Pb, sulpho-telluride.

IRON

Native Iron, Fe.
Awaruite, $FeNi_2$.
Josephinite, $FeNi_3$.
Chalmersite, $Cu_2S.Fe_4S_5$.
Sternbergite, $Ag_2S.Fe_4S_5$.
Pentlandite, (Fe,Ni)S.
Pyrrhotite, FeS.
Troilite, FeS.
Daubréelite, $FeS.Cr_2S_3$.
Badenite, $(Co,Ni,Fe)_2(As,Bi)_3$.
Chalcopyrite, $CuFeS_2$.
Pyrite, FeS_2.
Bravoite, $(Fe,Ni)S_2$.
Cobaltnickelpyrite, $(Fe,Co,Ni)S_2$.
Arsenoferrite, $FeAs_2$.
Marcasite, FeS_2.
Löllingite, $FeAs_2$.
Arsenopyrite, FeAsS.
Eichbergite, $(Cu,Fe)_2S.3(Bi,Sb)_2S_3$.
Histrixite, $5CuFeS_2.2Sb_2S_3.7Bi_2S_3$.
Berthierite, $FeS.Sb_2S_3$.
Stylotypite, $3(Cu_2,Ag_2,Fe)S.Sb_2S_3$.
Molysite, $FeCl_3$.
Lawrencite, $FeCl_2$.
Rinneite, $FeCl_2.3KCl.NaCl$.
Kremersite, $KCl_2.NH_4Cl.FeCl_2.H_2O$.
Erythrosiderite, $2KCl.FeCl_3.H_2O$.
Hematite, Fe_2O_3.
ILMENITE, $FeTiO_3$.
Senaite, $(Fe,Mn,Pb)O.TiO_2$.
Arizonite, $Fe_2O_3.3TiO_2$.
Sitaparite, $9Mn_2O_3.4Fe_2O_3.MnO_2.3CaO$.
Vredenburgite, $3Mn_3O_4.2Fe_2O_3$.
Hercynite, $FeO.Al_2O_3$.
Magnetite, $FeO.Fe_2O_3$.
FRANKLINITE, $(Fe,Zn,Mn)O.(Fe,Mn)_2O_3$.
Magnesioferrite, $MgO.Fe_2O_3$.
Jacobsite, $(Mn,Mg)O.(Fe,Mn)_2O_3$.
Chromite, $FeO.Cr_2O_3$.
Pseudobrookite, $Fe_4(TiO_4)_3$.
Bixbyite, $FeO.MnO_2$.
Göthite, $Fe_2O_3.H_2O$.
Lepidocrocite, $Fe_2O_3.H_2O$.
Limonite, $2Fe_2O_3.3H_2O$.
Turgite, $2Fe_2O_3.H_2O$.
Hydrogöthite, $3Fe_2O_3.4H_2O$.
Xanthosiderite, $Fe_2O_3.2H_2O$.
Esmeraldaite, $Fe_2O_3.4H_2O$.
Pyroaurite, $Fe(OH)_3.3Mg(OH)_2.3H_2O$.
Skemmatite, $3MnO_2.2Fe_2O_3.6H_2O$.
Beldongrite, $6Mn_2O_3.Fe_2O_3.8H_2O$.
Ankerite, $2CaCO_3.MgCO_3.FeCO_3$.
Mesitite, $2MgCO_3.FeCO_3$.
Pistomesite, $MgCO_3.FeCO_3$.
Siderite, $FeCO_3$.
Brugnatellite, $MgCO_3.5Mg(OH)_2.Fe(OH)_3.4H_2O$.
HYPERSTHENE, (Fe,Mg)SiO_3.
ACMITE, $NaFe(SiO_3)_2$.
Pyroxmangite, Mn,Fe, pyroxene.
Babingtonite, $(Ca,Fe,Mn)SiO_3$, with $Fe_2(SiO_3)_3$.
ANTHOPHYLLITE, (Mg,Fe)SiO_3.
GLAUCOPHANE, $NaAl(SiO_3)_2$. $(Fe,Mg)SiO_3$.
RIEBECKITE, $2NaFe(SiO_3)_2.FeSiO_3$.
CROCIDOLITE, $NaFe(SiO_3)_2.FeSiO_3$.
ARFVEDSONITE, Na,Ca,Fe, silicate.
Ænigmatite, Fe,Na,Ti-silicate.
Weinbergerite, $NaAlSiO_4.3FeSiO_3$.
Astrolite, $(Na,K)_2Fe(Al,Fe)_2(SiO_3)_5.H_2O$?
Iolite, $H_2(Mg,Fe)_4Al_8Si_{10}O_{37}$.
Taramellite, $Ba_4Fe''Fe_4'''Si_{10}O_{31}$.
Helvite, $(Be,Mn,Fe)_7Si_3O_{12}S$.
Almandite, $Fe_3Al_2(SiO_4)_3$.
Andradite, $Ca_3Fe_2(SiO_4)_3$.
Partschinite, $(Mn,Fe)_3Al_2Si_3O_{12}$.
Fayalite, Fe_2SiO_4.
Knebelite, $(Fe,Mn)_2SiO_4$.
Pyrosmalite, $H_7((Fe,Mn)Cl)(Fe,Mn)_4Si_4O_{16}$.
Homilite, $(Ca,Fe)_3B_2Si_2O_{10}$.
Allanite, $(Ca,Fe)_2(AlOH)(Al,Ce,Fe)_2(SiO_4)_3$.
ILVAITE, $CaFe_2(FeOH)(SiO_4)_2$.
Melanotekite, $3PbO.2Fe_2O_3.3SiO_2$.
Angaralite, $2(Ca,Mg)O.5(Al,Fe)_2O_3.6SiO_2$.
STAUROLITE, $(AlO)_4(AlOH)Fe(SiO_4)_2$.
Grandidierite, Al,Fe,Mg, silicate.
Aloisite, Fe,Ca,Mg,Na, silicate.
Pöchite, $H_{16}Fe_8Mn_2Si_3O_{29}$.
Lotrite, $3(Ca,Mg)O.2(Al,Fe)_2O_3.4SiO_2.2H_2O$.
Zinnwaldite, Li-Fe mica.
Biotite, Mg-Fe mica.
Lepidomelane, Iron mica.
Chloritoid, $H_2(Fe,Mg)Al_2SiO_7$.

Prochlorite, Fe,Mg,chlorite.
Moravite, $2FeO.2(Al,Fe)_2O_3.7SiO_2.2H_2O$.
Cronstedtite, $4FeO.2Fe_2O_3.3SiO_2.4H_2O$.
Thuringite, $8FeO.4(Al,Fe)_2O_3.6SiO_2.9H_2O$.
Brunsvigite, $9(Fe,Mg)O.2Al_2O_3.6SiO_2.8H_2O$.
Griffithite, $4(Mg,Fe,Ca)O.(Al,Fe)_2O_3.5SiO_2.7H_2O$.
Chamosite, Fe,Mg, silicate.
Stilpnomelane } Fe silicates.
Minguétite }
Strigovite, $H_4Fe_2(Al,Fe)_2Si_2O_{11}$.
Spodiophyllite, $(Na_2,K_2)_2(Mg,Fe)_3(Fe,Al)_2(SiO_3)_8$.
Celadonite, Fe,Mg,K, silicate.
Glauconite, Hydrous Fe,K, silicate.
Pholidolite, $K_2O.12(Fe,Mg)O.Al_2O_3.13SiO_2.5H_2O$.
Faratsihite, $(Al,Fe)_2O_3.2SiO_2.2H_2O$.
Melite, $2(Al,Fe)_2O_3.SiO_2.8H_2O$.
Chloropal, $H_6Fe_2(SiO_4)_2.2H_2O$.
Müllerite, $Fe_2Si_3O_9.2H_2O$.
Hisingerite } Hydrous ferric silicates.
Morencite }
Astrophyllite, Na, K, Fe, Mn, titano-silicate.
Narsarsukite, Fe,Na, titano-silicate.
Neptunite, Fe,Mn,Na,K, titano-silicate.
Joaquinite, Ca,Fe, titano-silicate.
Dysanalyte, Ca,Fe, titano-niobate.
Geikielite, $(Mg,Fe)TiO_3$.
Delorenzite, Fe,U,Y, titanate.
Neotantalite, Fe tantalate.
Columbite, Tantalite, $(Fe,Mn)(Nb,Ta)_2O_6$.
Tapiolite, $Fe(Ta,Nb)_2O_6$.
Yttrotantalite, Fe,Ca,Y,Er,Ce, tantalate.
Samarskite, Fe,U,Y, etc., niobate-tantalate.
Hielmite, Y,Fe,Mn,Ca, *stanno*-tantalate.
Monimolite, Pb,Fe, antimonate.
Triphylite, $Li(Fe,Mn)PO_4$.
Graftonite, $(Fe,Mn,Ca)_3P_2O_8$.
Triplite, $(RF)RPO_4$; R = Fe,Mn.
Triploidite $(ROH)RPO_4$; R = Fe,Mn.
Dufrenite, $FePO_4.Fe(OH)_3$.
Lazulite, $2AlPO_4.(Fe,Mg)(OH)_2$.
Arseniosiderite, $Ca_3Fe(AsO_4)_3.3Fe(OH)_3$.
Dickinsonite } Hydrous Mn,Fe,Na,
Fillowite } phosphate.
Messelite $(Ca,Fe)_3P_2O_8.2\frac{1}{2}H_2O$.
Anapaite, $(Ca,Fe)_3P_2O_8.4H_2O$.
Vivianite, $Fe_3P_2O_8.8H_2O$.
Symplesite, $Fe_3As_2O_8.8H_2O$.
Scorodite, $FeAsO_4.2H_2O$.
Vilateite, Hydrous Fe, Mn, phosphate.
Purpurite, $2(Fe,Mn)PO_4.H_2O$.
Strengite, $FePO_4.2H_2O$.
Phosphosiderite, $2FePO_4.3\frac{1}{2}H_2O$.
Barrandite, $(Al,Fe)PO_4.2H_2O$.
Koninckite, $FePO_4.3H_2O$.
Sicklerite, $Fe_2O_3.6MnO.4P_2O_5.3(Li,H)_2O$.
Salmonsite, $Fe_2O_3.9MnO.4P_2O_5.14H_2O$.
Liskeardite, $(Al,Fe)AsO_4.2(Al,Fe)(OH)_3.5H_2O$.
Pharmacosiderite, $6FeAsO_4.2Fe(OH)_3.12H_2O$.
Ludlamite, $2Fe_3P_2O_8.Fe(OH)_2.8H_2O$.
Cacoxenite, $FePO_4.Fe(OH)_3.4\frac{1}{2}H_2O$.
Beraunite, $2FePO_4.Fe(OH)_3.2\frac{1}{2}H_2O$.
Childrenite, $2AlPO_4.2Fe(OH)_2.2H_2O$.
Mazapilite, $Ca_3Fe_2(AsO_4)_4.2FeO(OH).5H_2O$.
Yukonite, $(Ca_3,Fe_2''')(AsO_4)_2.2Fe(OH)_3.5H_2O$.
Calcioferrite, $Ca_3Fe_2(PO_4)_4.Fe(OH)_3.8H_2O$.
Borickite, $Ca_3Fe_2(PO_4)_4.12Fe(OH)_3.6H_2O$.
Egueiite, Hydrous Fe,Al,Ca, phosphate.
Richelite, $4FeP_2O_8.Fe_2OF_2(OH)_2.36H_2O$.
Chenevixite, $Cu_2(FeO)_2As_2O_8.3H_2O$.
Chalcosiderite, $CuO.3Fe_2O_3.2P_2O_5.8H_2O$.
Roschérite, $(Mn,Fe,Ca)_2Al(OH)(PO_4)_2.2H_2O$.
Tripuhyite, $2FeO.Sb_2O_5$.
Flajolotite, $4FeSbO_4.3H_2O$.
Catoptrite, $14(Mn,Fe)O.2(Al,Fe)_2O_3.2SiO_2.Sb_2O_5$.
Derbylite, Fe antimo-titanate.
Diadochite, Hydrous Fe phosphate and sulphate.
Pitticite, Hydrous Fe arsenate and sulphate.
Beudantite, $3Fe_2O_3.2PbO.2SO_3.As_2O_5.6H_2O$.
Hinsdalite, $3Fe_2O_3.2PbO.2SO_3.P_2O_5.6H_2O$.
Lossenite, Hydrous Fe,Pb, arsenate and sulphate.
Ludwigite, $3MgO.B_2O_3.FeO.Fe_2O_3$.
Vonsenite, $3(Fe,Mg)O.B_2O_3.FeO.Fe_2O_3$.
Magnesioludwigite, $3MgO.B_2O_3.MgO.Fe_2O_3$.
Warwickite, $(Mg,Fe)_3TiB_2O_8$.
Lagonite, $Fe_2O_3.3B_2O_3.3H_2O$.
Hulsite, $12(Fe,Mg)O.2Fe_2O_3.1SnO_2.3B_2O_3$.
Millosevichite, $(Fe,Al)_2(SO_4)_3$.
Szomolnokite, $FeSO_4.H_2O$.
Ilesite, $(Mn,Zn,Fe)SO_4.4H_2O$.
Melanterite, $FeSO_4.7H_2O$.
Pisanite, $(Fe,Cu)SO_4.7H_2O$.
Halotrichite, $FeSO_4.Al_2(SO_4)_3.24H_2O$.
Bilinite, $FeSO_4.Fe_2(SO_4)_3.24H_2O$.
Dietrichite, $(Zn,Fe,Mn)SO_4.Al_2(SO_4)_3.22H_2O$.
Coquimbite, $Fe_2(SO_4)_3.9H_2O$.
Quenstedtite, $Fe_2(SO_4)_3.10H_2O$.
Ihlëite, $Fe_2(SO_4)_3.12H_2O$.
Phillipite, $CuSO_4.Fe_2(SO_4)_3.nH_2O$.
Ferronatrite, $3Na_2SO_4.Fe_2(SO_4)_3.6H_2O$.
Römerite, $FeSO_4.Fe_2(SO_4)_3.14H_2O$.
Beaverite, $CuO.PbO.Fe_2O_3.2SO_3.4H_2O$.
Vegasite, $PbO.3Fe_2O_3.3SO_3.6H_2O$.
Copiapite, $2Fe_2O_3.5SO_3.18H_2O$.
Castanite, $Fe_2O_3.2SO_3.8H_2O$.
Utahite, $3Fe_2O_3.2SO_3.7H_2O$.
Amaranthite, $Fe_2O_3.2SO_3.7H_2O$.
Fibroferrite, $Fe_2O_3.2SO_3.10H_2O$.
Raimondite, $2Fe_2O_3.3SO_3.7H_2O$.
Carphosiderite, $3Fe_2O_3.4SO_3.7H_2O$.
Planoferrite, $Fe_2O_3.SO_3.15H_2O$.
Glockerite, $2Fe_2O_3.SO_3.6H_2O$.
Knoxvillite, Hydrous Fe,Al,Cr, sulphate.

Cyprusite, $7Fe_2O_3.Al_2O_3.10SO_3.14H_2O$.
Botryogen, $MgO.FeO.Fe_2O_3.4SO_3.18H_2O$.
Sideronatrite, $2Na_2O.Fe_2O_3.4SO_3.7H_2O$.
Voltaite, $3(K_2,Fe)O.2(Al,Fe)_2O_3.6SO_3.9H_2O$.
Metavoltine, $5(K_2,Na_2,Fe)O.3Fe_2O_3.12SO_3.18H_2O$.
Jarosite, $K_2Fe_6(OH)_2(SO_4)_4$.
Natrojarosite, $Na_2Fe_6(OH)_{12}(SO_4)_4$.
Plumbojarosite, $PbFe_6(OH)_{12}(SO_4)_4$.
Quetenite, $MgO.Fe_2O_3.3SO_3.13H_2O$.
Rhomboclase, $Fe_2O_3.4SO_3.9H_2O$.
Emmonsite, Hydrous Fe tellurate.
Durdenite, $Fe_2(TeO_3)_3.4H_2O$.
WOLFRAMITE, $(Fe,Mn)WO_4$.
Reinite, $FeWO_4$.
Ferritungstite, $Fe_2O_3.WO_3.6H_2O$.
Humboltine, $FeC_2O_4.2H_2O$.

LEAD

Native Lead, Pb
Galena, PbS.
Altaite, Pb,Te.
Clausthalite, PbSe.
Naumannite, $(Ag_2,Pb)Se$.
Zorgite, Pb,Cu, selenide.
Chiviatite, $2PbS.3Bi_2S_3$.
Rezbanyite, $4PbS.5Bi_2S_3$.
Zinkenite, $PbS.Sb_2S_3$.
Andorite, $Ag_2S.2PbS.3Sb_2S_3$.
Sartorite, $PbS.As_2S_3$.
Platynite, $PbS.Bi_2Se_3$.
Galenobismutite, $PbS.Bi_2S_3$.
Hutchinsonite, $(Tl,Ag,Cu)_2S.As_2S_3 + PbS.As_2S_3$?
Baumhauerite, $4PbS.3As_2S_3$.
Schirmerite, $3(Ag_2,Pb)S.2Bi_2S_3$.
Rathite, $3PbS.2As_2S_3$.
Jamesonite, $2PbS.Sb_2S_3$.
Dufrenoysite, $2PbS.As_2S_3$.
Cosalite [illegible]$S.Bi_2S_3$.
Kobellite [illegible]$S.(Bi,Sb)_2S_3$.
Plagionite, Heteromorphite, Semseyite, Pb, Sb, sulphides.
Freieslebenite, $5(Pb,Ag_2)S.2Sb_2S_3$.
Diaphorite, $5(Pb,Ag_2)S.2Sb_2S_3$.
Boulangerite, $5PbS.2Sb_2S_3$.
Mullanite, $5PbS.2Sb_2S_3$.
Bournonite, $3(Pb,Cu_2)S.Sb_2S_3$.
Seligmanite, $3(Pb,Cu_2)S.As_2S_3$.
Aikinite, $2PbS.Cu_2S.Bi_2S_3$.
Lillianite, $3PbS.(Bi,Sb)_2S_3$.
Guitermanite, $3PbS.As_2S_3$.
Lengenbachite, $7[Pb,(Ag,Cu)_2]S.2As_2S_3$.
Jordanite, $4PbS.As_2S_3$.
Meneghinite, $4PbS.Sb_2S_3$
Geocronite, $5PbS.Sb_2S_3$.
Beegerite, $6PbS.Bi_2S_3$.
Epiboulangerite, $3PbS.Sb_2S_3$.
Teallite, $PbSnS_2$.
Franckeite, $Pb_5Sn_3FeSb_2S_{14}$.
Cylindrite, $Pb_3Sn_4FeSb_2S_{14}$.
Cotunnite, $PbCl_2$.
Percylite, $PbCl_2.CuO.H_2O$.
Boleite, $9PbCl_2.8CuO.3AgCl.9H_2O$.
Pseudo-boleite, $5PbCl_2.4CuO.6H_2O$.
Cumengite, $4PbCl_2.4CuO.5H_2O$.
Matlockite, $PbCl_2.PbO$.
Mendipite, $PbCl_2.2PbO$.
Lorettoite, $PbCl_2.6PbO$.
Laurionite, $PbCl_2.Pb(OH)_2$.
Penfieldite, $2PbCl_2.PbO$.
Daviesite, Pb oxychloride.
Schwartzenbergite, $Pb(I,Cl)_2.2PbO$.
Massicot, PbO.
Senaite, $(Fe,Mn,Pb)O.TiO_2$.
Coronadite, $(Mn,Pb)Mn_3O_7$.
Minium, $2PbO.PbO_2$.
Plattnerite, PbO_2.
Cerussite, $PbCO_3$.
PHOSGENITE, $PbCO_3.PbCl_2$.
Hydrocerussite, $2PbCO_3.Pb(OH)_2$.
Dundasite, $Pb(AlO)_2(CO_3)_2$.
Alamosite, $PbSiO_3$.
Barysilite, $Pb_3Si_2O_7$.
Molybdophyllite, $(Pb,Mg)SiO_4.H_2O$.
Ganomalite, $Pb_4(PbOH)_2Ca_4(Si_2O_7)_3$.
Nasonite, $Pb_4(PbCl)_2Ca_4(Si_2O_7)_3$.
Margarosanite, $Pb(Ca,Mn)_2(SiO_3)_3$.
Hyalotekite, $(Pb,Ba,Ca)B_2(SiO_3)_{12}$.
Roeblingite, $5(H_2CaSiO_4).2(CaPbSO_4)$
Hancockite, Pb,Mn,Ca,Al, etc., silicate.
Kentrolite, $3PbO.2Mn_2O_3.3SiO_2$.
Melanotekite, $3PbO.2Fe_2O_3.3SiO_2$.
Plumboniobite, Y,U,Pb,Fe, niobate
Monimolite, Pb,Fe, antimonate.
Carminite, $Pb_3As_2O_8.10FeAsO_4$.
Georgiadésite, $Pb_3(AsO_4)_2.3PbCl_2$.
PYROMORPHITE, $Pb_4(PbCl)(PO_4)_3$.
Mimetite, $Pb_4(PbCl)(AsO_4)_3$.
Vanadinite, $Pb_4(PbCl)(VO_4)_3$.
Trigonite, $Pb_3MnH(AsO_3)_3$.
Plumbogummite, Pb,Al, phosphate.
Descloizite, $(Pb,Zn)_2(OH)VO_4$.
Pyrobelonite, $4PbO.7MnO.2V_2O_5.3H_2O$.
Dechenite, PbV_2O_6.
Psittacinite, Mottramite } Pb,Cu, vanadates.
Furnacite, Pb,Cu, chrom-arsenate.
Tsumebite, Pb,Cu, phosphate.
Rosiérésite, Hydrous Al,Pb,Cu, phosphate.
Ferrazite, $3(Ba,Pb)O.2P_2O_5.8H_2O$.
Bayldonite, $(Pb,Cu)_3As_2O_8.(Pb,Cu)(OH)_2.H_2O$.
Hügelite, Hydrous Pb,Zn, vanadate.
Bindheimite, Hydrous Pb antimonate.
Nadorite, $PbClSbO_2$.
Ecdemite, $Pb_4As_2O_7.2PbCl_2$.
Ochrolite, $Pb_5Sb_2O_7.2PbCl_2$.
Mauzeliite, Pb,Ca,titano-antimonate.
Beudantite, $3Fe_2O_3.2PbO.2SO_3.As_2O_5.6H_2O$.
Hinsdalite, $3Fe_2O_3.2PbO.2SO_3.P_2O_5.6H_2O$.
Lossenite, Hydrous Fe, Pb, arsenate and sulphate.
Anglesite, $PbSO_4$.
CROCOITE, $PbCrO_4$

Phœnicochroite, $3PbO.2CrO_3$.
Vauquelinite, $2(Pb,Cu)CrO_4.(Pb,Cu)_3P_2O_8$.
Bellite, Pb arseno-chromate.
Leadhillite, $PbSO_4.2PbCO_3.Pb(OH)_2$.
Caracolite, $Pb(OH)Cl.Na_2SO_4$.
Lanarkite, Pb_2SO_5.
Caledonite, $(Pb,Cu)SO_4.(Pb,Cu)(OH)_2$.
Linarite, $(Pb,Cu)SO_4.(Pb,Cu)(OH)_2$.
Beaverite, $CuO.PbO.Fe_2O_3.2SO_3.4H_2O$.
Vegasite, $PbO.3Fe_2O_3.3SO_3.6H_2O$.
Plumbojarosite, $PbFe_6(OH)_{12}(SO_4)_4$.
Palmierite, $3(K,Na)_2SO_4.4PbSO_4$.
Stolzite, Raspite } $PbWO_4$.
Chillagite, $3PbWO_4.PbMoO_4$.
Wulfenite, $PbMoO_4$.

LITHIUM

Petalite, $LiAl(Si_2O_5)_2$.
Spodumene, $LiAl(SiO_3)_2$.
Eucryptite, $LiAlSiO_4$.
Lepidolite, Lithium mica.
Zinnwaldite, Lithium-iron mica.
Manandonite, $H_{24}Li_4Al_{14}B_4Si_6O_{63}$.
Triphylite, $Li(Fe,Mn)PO_4$.
Lithiophilite, $Li(Mn,Fe)PO$.
Amblygonite, $Li(AlF)PO_4$.
Fremontite, $(Na,Li)Al(OH,F)PO_4$.
Sicklerite, $Fe_2O_3.6MnO.4P_2O_5.3(Li,H)_2O$.

MAGNESIUM

Chloromagnesite, $MgCl_2$.
Sellaite, MgF_2.
Nocerite, $2(Ca,Mg)F_2(Ca,Mg)O$.
Koenenite, Al,Mg, oxychloride.
Carnallite, $KCl.MgCl_2.6H_2O$.
Bischofite, $MgCl_2.6H_2O$.
Tachhydrite, $CaCl_2.2MgCl_2.12H_2O$.
Ralstonite, $(Na_2,Mg)F_2.3Al(F.OH)_3.2H_2O$.
Periclase, MgO.
Spinel, $MgO.Al_2O_3$.
Magnesioferrite, $MgO.Fe_2O_3$.
Jacobsite, $(Mn,Mg)O.(Fe,Mn)_2O_3$.
Brucite, $Mg(OH)_2$.
Hydrotalcite, $Al(OH)_3.3Mg(OH)_2.3H_2O$.
Pyroaurite, $Fe(OH)_3.3Mg(OH)_2.3H_2O$.
Dolomite, $CaCO_3.MgCO_3$.
Ankerite, $CaCO_3.(Mg,Fe,Mn)CO_3$.
Magnesite, $MgCO_3$.
Mesitite, $2MgCO_3.FeCO_3$.
Pistomesite, $MgCO_3.FeCO_3$.
Northupite, $MgCO_3.Na_2CO_3.NaCl$.
Tychite, $2MgCO_3.2Na_2CO_3.Na_2SO_4$.
Nesquehonite, $MgCO_3.3H_2O$.
Hydromagnesite, $3MgCO_3.Mg(OH)_2.3H_2O$.
Hydrogiobertite, $MgCO_3.Mg(OH)_2.2H_2O$.
Artinite, $MgCO_3.Mg(OH)_2.3H_2O$.
Lansfordite, $3MgCO_3.Mg(OH)_2.21H_2O$.
Brugnatellite, $MgCO_3.5Mg(OH)_2.Fe(OH)_3.4H_2O$.
Gajite, basic, hydrous Ca,Mg, carbonate.
Stichtite, $2MgCO_3.5Mg(OH)_2.2Cr(OH)_3$.
Enstatite, $MgSiO_3$.
Hypersthene, $(Fe,Mg)SiO_3$.
Pyroxene, Ca,Mg, etc., silicate.
Anthophyllite, $(Mg,Fe)SiO_3$.
Amphibole, Ca,Mg, etc., silicate.
Glaucophane, $NaAl(SiO_3)_2.(Fe,Mg)SiO_3$.
Iolite, $H_2(Mg,Fe)_4Al_8Si_{10}O_{37}$.
Molybdophyllite, $(Pb,Mg)SiO_4.H_2O$.
Pyrope, $Mg_3Al_2(SiO_4)_3$.
Chrysolite, $(Mg,Fe)_2SiO_4$.
Monticellite, $CaMgSiO_4$.
Fosterite, Mg_2SiO_4.
Hortonolite, $(Fe,Mg,Mn)_2SiO_4$.
Chondrodite, $[Mg(F,OH)]_2Mg_3(SiO_4)_2$.
Humite, $[Mg(F,OH)]_2Mg_5(SiO_4)_3$.
Clinohumite, $[Mg(F,OH)]_2Mg_7(SiO_4)_4$.
Kornerupine, $MgAl_2SiO_6$.
Sapphirine, $Mg_5Al_{12}Si_2O_{27}$.
Serendibite, $10(Ca,Mg)O.5Al_2O_3.B_2O_3.6SiO_2$.
Silicomagnesiofluorite, $H_2Ca_4Mg_3Si_2O_7F_{10}$.
Lotrite, $3(Ca,Mg)O.2(Al,Fe)_2O_3.4SiO_2.2H_2O$.
Biotite, Magnesium-iron mica.
Phlogopite, Magnesium mica.
Tæniolite, K, Mg, silicate.
Seybertite, $H_3(Mg,Ca)_5Al_3Si_2O_{18}$.
Xanthophyllite, $H_8(Mg,Ca)_{14}Al_{16}Si_5O_{62}$.
Chloritoid, $H_2(Fe,Mg)Al_2SiO_7$.
Clinochlore, Penninite, $H_8Mg_5Al_2Si_3O_{18}$.
Prochlorite, Fe,Mg, chlorite.
Brunsvigite, $9(Fe,Mg)O.2Al_2O_3.6SiO_2.8H_2O$.
Griffithite, $4(Mg,Fe,Ca)O.(Al,Fe)_2O_3.5SiO_2.7H_2O$.
Spodiophyllite, $(Na_2,K_2)_2(Mg,Fe)_3(Fe,Al)_2(SiO_3)_8$.
Serpentine, $H_4Mg_3Si_2O_9$.
Deweylite, $4MgO.3SiO_2.6H_2O$.
Genthite, $2NiO.2MgO.3SiO_2.6H_2O$.
Nepouite, $3(Ni,Mg)O.2SiO_2.2H_2O$.
Garnierite, $H_2(Ni,Mg)SiO_4$ + water.
Talc, $H_2Mg_3(SiO_3)_4$.
Sepiolite, $H_4Mg_2Si_3O_{10}$.
Spadaite, $5MgO.6SiO_2.4H_2O$.
Saponite, Hydrous Mg, Al, silicate.
Celadonite, Fe,Mg,K, silicate.
Pholidolite, $K_2O.12(Fe,Mg)O.\ldots3.13SiO_2.5H_2O$.
Colerainite, $4MgO.Al_2O_3.2SiO_2.5H_2O$.
Tartarkaite, Al,Mg, hydrous silicate.
Geikielite, $(Mg,Fe)TiO_3$.
Berzeliite, $(Ca,Mg,Mn,Na_2)_3As_2O_8$.
Wagnerite, $(MgF)MgPO_4$.
Adelite, $(MgOH)CaAsO_4$.
Tilasite, $(MgF)CaAsO_4$.
Lazulite, $2AlPO_4.(Fe,Mg)(OH)_2$.
Struvite, Hydrous, NH_4,Mg, phosphate.
Pyrophosphorite, $Mg_2P_2O_7.4(Ca_3P_2O_8.Ca_2P_2O_7)$.
Roselite, $(Ca,Co,Mg)_3As_2O_8.2H_2O$.
Bobierrite, $Mg_3P_2O_8.8H_2O$.
Hœrnesite, $Mg_3As_2O_8.8H_2O$.
Cabrerite, $(Ni,Mg)_3As_2O_8.8H_2O$.
Newberyite, $HMgPO_4.3H_2O$.
Hannayite, Schertelite } Hydrous, NH_4,Mg, phosphates.

Lüneburgite, $3MgO.B_2O_3.P_2O_5.8H_2O$.
Nitromagnesite, $Mg(NO_3)_2.nH_2O$.
Sussexite, $H(Mn,Zn,Mg)BO_3$.
Ludwigite, $3MgO.B_2O_3.FeO.Fe_2O_3$.
Vonsenite, $3(Fe,Mg)O.B_2O_3.FeO.Fe_2O_3$.
Magnesioludwigite, $3MgO.B_2O_3.MgO.Fe_2O_3$.
Pinakiolite, $3MgO.B_2O_3.MnO.Mn_2O_3$.
Szaibelyite, $2Mg_3B_4O_{11}.3H_2O$.
Boracite, $Mg_7Cl_2B_{16}O_{30}$.
Ascharite, Hydrous Mg, borate.
Warwickite, $(Mg,Fe)_3TiB_2O_8$.
Pinnoite, $MgB_2O_4.3H_2O$.
Heintzite, Hydrous Mg,K, borate.
Hulsite, $12(Fe,Mg)O.2Fe_2O_3.1SnO_2.3B_2O_3.2H_2O$.
Hydroboracite, $CaMgB_6O_{11}.6H_2O$.
Sulphoborite, $2MgSO_4.4MgHBO_3.7H_2O$.
Langbeinite, $K_2Mg_2(SO_4)_3$.
Vanthoffite, $3Na_2SO_4.MgSO_4$.
Kainite, $MgSO_4.KCl.3H_2O$.
Kieserite, $MgSO_4.H_2O$.
Epsomite, $MgSO_4.7H_2O$.
Cupromagnesite, $(Cu,Mg)SO_4.7H_2O$.
Löweite, $MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$.
Blödite, $MgSO_4.Na_2SO_4.4H_2O$.
Leonite, $MgSO_4.K_2SO_4.4H_2O$.
Boussingaulite, $(NH_4)_2SO_4.MgSO_4.6H_2O$.
Picromerite, $MgSO_4.K_2SO_4.6H_2O$.
Polyhalite, $2CaSO_4.MgSO_4.K_2SO_4.2H_2O$.
Hexahydrite, $MgSO_4.6H_2O$.
Pickeringite, $MgSO_4.Al_2(SO_4)_3.22H_2O$.
Botryogen, $MgO.FeO.Fe_2O_3.4SO_3.18H_2O$.
Quetenite, $MgO.Fe_2O_3.3SO_3.13H_2O$.

MANGANESE

Alabandite, MnS.
Hauerite, MnS_2.
Samsonite, $2Ag_2S.MnS.Sb_2S_3$.
Sacchite, $MnCl_2$.
Chlormanganokalite, $4KCl.MnCl_2$.
Manganosite, MnO.
Senaite, $(Fe,Mn,Pb)O.TiO_2$.
Pyrophanite, $MnTiO_3$.
Sitaparite, $9Mn_2O_3.4Fe_2O_3.MnO_2.3CaO$.
Vredenburgite, $3Mn_3O_4.2Fe_2O_3$.
Franklinite, $(Fe,Zn,Mn)O.(Fe,Mn)_2O_3$.
Jacobsite, $(Mn,Mg)O.(Fe,Mn)_2O_3$.
Hausmannite, $MnO.Mn_2O_3$.
Coronadite, $(Mn,Pb)Mn_8O_7$.
Crednerite, $3CuO.2Mn_2O_3$.
Braünite, $3Mn_2O_3.MnSiO_3$.
Bixbyite, $FeO.MnO_2$.
Polianite, MnO_2.
Pyrolusite, MnO_2.
Manganite, $Mn_2O_3.H_2O$.
Pyrochroite, $Mn(OH)_2$.
Bäckströmite, $Mn(OH)_2$.
Chalcophanite, $(Mn,Zn)O.2MnO_2.2H_2O$
Hetærolite, $2ZnO.2Mn_2O_3.1H_2O$.
Psilomelane, Hydrous Mn manganate.
Wad, Mn oxides.
Skemmatite, $3MnO_2.2Fe_2O_3.6H_2O$.
Beldongrite, $6Mn_3O_5.Fe_2O_3.8H_2O$.
Rhodochrosite, $MnCO_3$.
Schizolite, $HNa(Ca,Mn)_2(SiO_3)_3$
Låvenite, Zr-silicate of Mn, Ca.
Rhodonite, $MnSiO_3$.
Pyroxmangite, Mn,Fe pyroxene.
Babingtonite, $(Ca,Fe,Mn)SiO_3$ with $Fe_2(SiO_3)_3$.
Margarosanite, $Pb(Ca,Mn)_2(SiO_3)_3$.
Helvite, $(Be,Mn,Fe)_7Si_3O_{12}S$.
Danalite, $(Be,Fe,Zn,Mn)_7Si_3O_{12}S$.
Spessartite, $Mn_3Al_2(SiO_4)_3$.
Partschinite, $(Mn,Fe)_3Al_2Si_3O_{12}$.
Glaucochroite, $CaMnSiO_4$.
Knebelite, $(Fe,Mn)_2SiO_4$.
Tephroite, Mn_2SiO_4.
Trimerite, $(Mn,Ca)_2SiO_4.Be_2SiO_4$.
Friedelite, $H_7(MnCl)Mn_4Si_4O_{16}$.
Pyrosmalite, $H_7((Fe,Mn)Cl)(Fe,Mn)_4Si_4O_{16}$
Piedmontite, Mn epidote.
Hancockite, Pb,Mn,Ca,Al, etc., silicate.
Harstigite, Mn,Ca, silicate.
Leucophœnicite, $Mn_5(MnOH)_2(SiO_4)_3$.
Ardennite, Al,Mn,V, silicate.
Långbanite, Mn silicate with Fe antimonate.
Kentrolite, $3PbO.2Mn_2O_3.3SiO_2$.
Carpholite, $H_4MnAl_2Si_2O_{10}$.
Pöchite, $H_{16}Fe_8Mn_2Si_3O_{29}$.
Inesite, $H_2(Mn,Ca)_6Si_6O_{19}.3H_2O$.
Ganophyllite, $7MnO.Al_2O_3.8SiO_2.6H_2O$.
Alurgite, Manganese mica.
Dixenite, $MnSiO_3.2Mn_2(OH)AsO_3$.
Bementite, $H_6Mn_5(SiO_4)_4$.
Ectropite, $Mn_2Si_8O_{28}.7H_2O$.
Agnolite, $H_2Mn_3(SiO_3)_4.H_2O$.
Hodgkinsonite, $3(Zn,Mn)O.SiO_2.H_2O$.
Gageite, Hydrous, Mn,Mg,Zn, silicate.
Caryopilite, $4MnO.3SiO_2.3H_2O$.
Neotocite, Hydrous, Mn, Fe, silicate.
Astrophyllite, Na,K,Fe,Mn,Ti-silicate.
Neptunite, Fe,Mn,K,Na, titano-silicate.
Columbite-Tantalite, $(Fe,Mn)(Nb,Ta)_2O_6$.
Hielmite, Y,Fe,Mn,Ca, stanno-tantalate.
Berzeliite, $(Ca,Mg,Mn,Na_2)_3As_2O_8$.
Lithiophilite, $Li(Mn,Fe)PO_4$.
Natrophilite, $NaMnPO_4$.
Graftonite, $(Fe,Mn,Ca)_3P_2O_8$.
Triplite, $(RF)RPO_4$; R = Fe,Mn.
Triploidite $(ROH)RPO_4$; R = Mn,Fe.
Sarkinite, $(MnOH)MnAsO_4$.
Trigonite, $Pb_3MnH(AsO_3)_3$.
Lacroixite, $Na_4(Ca,Mn)_4Al_3(F,OH)_4P_3O_{10}.2H_2O$.
Pyrobelonite, $4PbO.7MnO.2V_2O_5.3H_2O$.
Allactite, $Mn_3As_2O_8.4Mn(OH)_2$.
Synadelphite, $2(Al,Mn)AsO_4.5Mn(OH)_2$.
Flinkite, $MnAsO_4.2Mn(OH)_2$.
Hematolite, $(Al,Mn)AsO_4.4Mn(OH)_2$.
Retzian, Y,Mn,Ca, phosphate.
Arseniopleite, $(Mn,Ca)_9(Mn,Fe)_2(OH)_6(AsO_4)_6$.
Manganostibiite, Mn antimonate.

Dickinsonite } Hydrous Mn,Fe,Na,
Fillowite } phosphates.
Brandite, $Ca_2MnAs_2O_8.2H_2O$.
Fairfieldite, $Ca_3MnP_2O_8.2H_2O$.
Reddingite, $Mn_3P_2O_8.3H_2O$.
Palaite, $5MnO.2P_2O_5.4H_2O$.
Stewartite, $3MnO.P_2O_5.4H_2O$.
Purpurite, $2(Fe,Mn)PO_4.H_2O$.
Sicklerite, $Fe_2O_3.6MnO.4P_2O_5.3(Li,H)_2O$.
Salmonsite, $Fe_2O_3.9MnO.4P_2O_5.14H_2O$.
Hureaulite, $H_2Mn_5(PO_4)_4.4H_2O$.
Hemafibrite, $Mn_3As_2O_8.3Mn(OH)_2.2H_2O$.
Eosphorite, $2AlPO_4.2(Mn,Fe)(OH)_2.2H_2O$.
Roschérite, $(Mn,Fe,Ca)_2Al(OH)(PO_4)_2.2H_2O$
Catoptrite, $14(Mn,Fe)O.2(Al,Fe)_2O_3.2SiO_2.Sb_2O_5$.
Sussexite, $H(Mn,Zn,Mg)BO_3$.
Pinakiolite, $3MgO.B_2O_3.MnO.Mn_2O_3$.
Szmikite, $MnSO_4.H_2O$.
Ilesite, $(Mn,Zn,Fe)SO_4.4H_2O$.
Mallardite, $MnSO_4.7H_2O$.
Apjohnite, $MnSO_4.Al_2(SO_4)_3.24H_2O$.
Dietrichite, $(Zn,Fe,Mn)SO_4.Al_2(SO_4)_3.22H_2O$.
Hübnerite, $MnWO_4$.

MERCURY

Native Mercury, Hg.
Amalgam, (Ag,Hg).
Metacinnabarite, HgS.
Tiemannite, HgSe.
Onofrite, Hg(S,Se).
Coloradoite, HgTe.
Cinnabar, HgS.
Livingstonite, $HgS.2Sb_2S_3$.
Calomel, HgCl.
Kleinite, Hg,NH_4, chloride.
Eglestonite, Hg_4Cl_2O.
Terlinguaite, HgClO.
Mosesite, Hydrous Hg,NH_4, chloride.
Montroydite, HgO.
Ammiolite, Hg antimonite.

MOLYBDENUM

Molybdenite, MoS_2.
Molybdite, MoO_3.
Powellite, $Ca(Mo,W)O_4$.
Chillagite, $3PbWO_4.PbMoO_4$.
WULFENITE, $PbMoO_4$.
Koechlinite, $Bi_2O_3.MoO_3$.

NICKEL

Awaruite, $FeNi_2$.
Josephinite, $FeNi_3$.
Maucherite, Ni_3As_2.
PENTLANDITE, (Fe,Ni)S.
Millerite, NiS.
Beyrichite, NiS.
Hauchecornite, Ni(Bi,Sb,S)?
Niccolite, NiAs.
Breithauptite, NiSb.
Polydymite, Ni_4S_5.
Badenite, $(Co,Ni,Fe)_2(As,Bi)_3$.
Bravoite, $(Fe,Ni)S_2$.
Cobaltnickelpyrite, $(Co,Ni,Fe)S_2$.
CHLOANTHITE, $NiAs_2$.
Gersdorffite, NiAsS.
Willyamite, $CoS_2.NiS_2.CoSb_2.NiSb_2$.
Villamaninite, Cu,Ni,Co,Fe, sulphide.
Ullmanite, NiSbS.
Kallilite, Ni(Sb,Bi)S.
Rammelsbergite, $NiAs_2$.
Wolfachite, Ni(As,Sb)S.
Melonite, $NiTe_2$.
Bunsenite, NiO.
Zaratite, $NiCO_3.2Ni(OH)_2.4H_2O$.
Genthite, $2NiO.2MgO.3SiO_2.6H_2O$.
Nepouite, $3(Ni,Mg)O.2SiO_2.2H_2O$.
Garnierite, $H_2(Ni,Mg)SiO_4$ + water.
Connarite, $H_4Ni_2Si_3O_{10}$.
Annabergite, $Ni_3As_2O_8.8H_2O$.
Cabrerite, $(Ni,Mg)_3As_2O_8.8H_2O$.
Forbesite, $H_2(Ni,Co)_2As_2O_8.8H_2O$.
Lindackerite, $3NiO.6CuO.SO_3.2As_2O_5.7H_2O$.
Morenosite, $NiSO_4.7H_2O$.

PLATINUM

Native Platinum, Pt.
Sperrylite, $PtAs_2$.

POTASSIUM

SYLVITE, KCl.
Chlormanganokalite, $4KCl.MnCl_2$.
Rinneite, $FeCl_2.3KCl.NaCl$.
Hieratite, K,Si, fluoride.
CARNALLITE, $KCl.MgCl_2.6H_2O$.
Kremersite, $KCl,NH_4Cl.FeCl_2.H_2O$.
Erythrosiderite, $2KCl.FeCl_3.H_2O$.
Milarite, $HKCa_2Al_2(Si_2O_6)_6$.
Orthoclase, Microcline, $KAlSi_3O_8$.
Hyalophane, $(K_2,Ba)Al_2(SiO_3)_4$.
Anorthoclase, $(Na,K)AlSi_3O_8$.
Leucite, $KAl(SiO_3)_2$.
Kaliophilite, $KAlSiO_4$.
Apophyllite, $H_7KCa_4(SiO_3)_8.4\frac{1}{2}H_2O$.
Ptilolite, $(Ca,K_2,Na_2)Al_2Si_{10}O_{24}.5H_2O$.
Mordenite, $(Ca,K_2,Na_2)Al_2Si_{10}O_{24}.20H_2O$.
Wellsite, $(Ba,Ca,K_2)Al_2Si_3O_{10}.3H_2O$.
Phillipsite, $(K_2,Ca)Al_2Si_4O_{12}.4\frac{1}{2}H_2O$.
Harmotone, $(K_2,Ba)Al_2Si_6O_{14}.5H_2O$.
Offretite, Potash zeolite.
Muscovite, $H_2KAl_3(SiO_4)_3$.
Tæniolite, K,Mg, silicate.
Spodiophyllite, $(Na_2K_2)_2(Mg,Fe)_3(Fe,Al)_2(SiO_3)_8$.
Celadonite, Fe,Mg,K, silicate.
Glauconite, Hydrous Fe, K, silicate.
Astrophyllite, Na,K,Mn,Fe, titano-silicate.
Palmerite, $HK_2Al_2(PO_4)_3.7H_2O$.
Carnotite, $K_2O.2U_2O_3.V_2O_5.3H_2O$.
Niter, KNO_3.
Rhodizite, Al,K, borate.
Heintzite, Hydrous Mg,K, borate.
Taylorite, $5K_2SO_4.(NH_4)_2SO_4$.
Aphthitalite, $(K,Na)_2SO_4$.
Langbeinite, $K_2Mg_2(SO_4)_3$.

Kainite, $MgSO_4.KCl.3H_2O$.
Hanksite, $9Na_2SO_4.2Na_2CO_3.KCl$.
Misenite, $HKSO_4$.
Lecontite, $(Na,NH_4,K)SO_4.2H_2O$.
Syngenite, $CaSO_4.K_2SO_4.H_2O$.
Leonite, $MgSO_4.K_2SO_4.4H_2O$.
Picromerite, $MgSO_4.K_2SO_4.6H_2O$.
Polyhalite, $2CaSO_4.MgSO_4.K_2SO_4.2H_2O$.
Kalinite, $KAl(SO_4)_2.12H_2O$.
Voltaite, $3(K_2,Fe)O.2(Al,Fe)_2O_3.6SO_3.9H_2O$.
Metavoltine, $5(K_2,Na_2,Fe)O.3Fe_2O_3.12SO_3.18H_2O$.
ALUNITE, $K_2Al_6(OH)_{12}(SO_4)_4$.
Jarosite, $K_2Fe_6(OH)_{12}(SO_4)_4$.
Palmierite, $3(K,Na)_2SO_4.4PbSO_4$.
Löwigite, $K_2O.3Al_2O_3.4SO_3.9H_2O$.

SILVER

Native Silver, Ag.
Amalgam, (Ag,Hg).
Dyscrasite, Ag_3Sb.
Chilenite, Ag_6Bi.
Cocinerite, Cu_4AgS.
Stützite, Ag_4Te.
Naumannite, $(Ag_2,Pb)Se$
Argentite, Ag_2S.
Hessite, Ag_2Te.
Petzite, $(Ag,Au)_2Te$.
Aquilarite, $Ag_2(S,Se)$.
Eucairite, $Cu_2Se.Ag_2Se$.
Crookesite, $(Cu,Tl,Ag)_2Se$.
Stromeyrite, $(Ag,Cu)_2S$.
Acanthite, Ag_2S.
Sternbergite, $Ag_2S.Fe_4S_5$.
Sylvanite, $(Au,Ag)Te_2$.
Krennerite, $(Au,Ag)Te_2$.
Muthmannite, (Ag,Au)Te.
Andorite, $Ag_2S.2PbS.3Sb_2S_3$.
Matildite, $Ag_2S.Bi_2S_3$.
Miargyrite, $Ag_2S.Sb_2S_3$.
Smithite, $Ag_2S.Sb_2S_3$.
Trechmanite, $Ag_2S.As_2S_3$.
Hutchinsonite, $(Tl,Ag,Cu)_2S.As_2S_3 + PbS.As_2S_3$(?).
Schirmerite, $3(Ag_2.Pb)S.2Bi_2S_3$.
Freieslebenite, $5(Pb,Ag_2)S.2Sb_2S_3$.
Diaphorite, $5(Pb,Ag_2)S.2Sb_2S_3$.
Stylotypite, $3(Cu_2,Ag_2,Fe)S.Sb_2S_3$.
Lengenbachite, $7[Pb,(Ag,Cu)_2]S.2As_2S_3$.
PYRARGYRITE, $3Ag_2S.Sb_2S_3$.
PROUSTITE, $3Ag_2S.As_2S_3$.
Pyrostilpnite, $3Ag_2S.Sb_2S_3$.
Samsonite, $2Ag_2S.MnS.Sb_2S_3$.
STEPHANITE, $5Ag_2S.Sb_2S_3$.
POLYBASITE, $9Ag_2S.Sb_2S_3$.
Pearceite, $9Ag_2S.As_2S_3$.
Polyargyrite, $12Ag_2S.Sb_2S_3$.
Xanthoconite, $3Ag_2S.As_2S_3$.
Argyrodite, $4Ag_2S.GeS_2$.
Canfieldite, $4Ag_2S.SnS_2$.
Cerargyrite, AgCl.
Embolite, Ag(Br,Cl).
Bromyrite, AgBr.
Iodobromite, $2AgCl.2AgBr.AgI$.
Miersite, $4AgI.CuI$.
Iodyrite, AgI.

SODIUM

Halite, NaCl.
Villiaumite, NaF.
Huantajayite, $20NaCl.AgCl$.
Rinneite, $FeCl_3.3KCl.NaCl$.
CRYOLITE, Na_3AlF_6.
Chiolite, $5NaF.3AlF_3$.
Ralstonite, $(Na_2,Mg)F_2.3Al(F,OH)_3.2H_2O$.
Northupite, $MgCO_3.Na_2CO_3.NaCl$.
Tychite, $2MgCO_3.2Na_2CO_3.Na_2SO_4$.
Dawsonite, $Na_3Al(CO_3)_3.2Al(OH)_3$.
Thermonatrite, $Na_2CO_3.H_2O$.
Natron, $Na_2CO_3.10H_2O$.
Pirssonite, $CaCO_3.Na_2CO_3.2H_2O$.
Gay-Lussite, $CaCO_3.Na_2CO_3.5H_2O$.
Trona, $Na_2CO_3.HNaCO_3.2H_2O$.
Eudidymite, Epididymite, $HNaBeSi_3O_8$.
Rivaite, $(Ca,Na_2)Si_2O_5$.
Anorthoclase, $(Na,K)AlSi_3O_8$.
Albite, $NaAlSi_3O_8$.
Oligoclase, Andesine, Labradorite } Mixtures of $NaAlSi_3O_8$ and $CaAl_2Si_2O_8$.
Anemousite, $NaO.2CaO.3Al_2O_3.9SiO_2$.
Ussingite, $HNa_2Al(SiO_3)_3$.
ACMITE, $NaFe(SiO_3)_2$.
JADEITE, $NaAl(SiO_3)_2$.
PECTOLITE, $HNaCa_2(SiO_3)_3$.
Schizolite, $HNa(Ca,Mn)_2(SiO_3)_3$.
Rosenbuschite, near pectolite with Zr.
Wöhlerite, Zr-silicate and niobate of Ca,Na.
Hiortdahlite, $(Na_2.Ca)(Si,Zr)O_3$.
GLAUCOPHANE, $NaAl(SiO_3)_2.(Fe,Mg)SiO_3$.
RIEBECKITE, $2NaFe(SiO_3)_2.FeSiO_3$.
CROCIDOLITE, $NaFe(SiO_3)_2.FeSiO_3$.
Arfvedsonite, Na,Ca,Fe'' silicate.
Ænigmatite, Fe,Na,Ti-silicate.
Weinbergerite, $NaAlSiO_4.3FeSiO_3$.
Elpidite, $Na_2O.ZrO_2.6SiO_2.3H_2O$.
Catapleiite, $H_4(Na_2,Ca)ZrSi_3O_{11}$.
Leucophanite, Meliphanite } Na,Be,Ca, fluo-silicates.
Nephelite, $NaAlSiO_4$.
CANCRINITE, $H_6Na_6Ca(NaCO_3)_2Al_6(SiO_4)_9$.
Microsommite, Davyne, near cancrinite.
SODALITE, $Na_4(AlCl)Al_2(SiO_4)_3$
Hackmanite, near sodalite.
HAUYNITE, $(Na_2,Ca)_2(NaSO_4.Al)Al_2(SiO_4)_3$.
Noselite, $Na_4(NaSO_4.Al)Al_2(SiO_4)_3$.
LAZURITE, $Na_4(NaS_3.Al)Al_2(SiO_4)_3$.
SCAPOLITE GROUP, Mixtures of $Ca_4Al_6Si_6O_{25}$ and $Na_4Al_3Si_9O_{24}Cl$.
Sarcolite, $(Ca,Na_2)_3Al_2(SiO_4)_3$.
Melilite, $Na_2(Ca,Mg)_{11}(Al,Fe)_4(SiO_4)_9$.
Mordenite, $(Ca,K_2,Na_2)Al_2Si_{10}O_{24}.20H_2O$.
Stilbite, $(Na_2,Ca)Al_2Si_6O_{16}.6H_2O$.

Flokite, $H_8(Ca,Na_2)Al_2Si_9O_{26}.2H_2O$.
CHABAZITE, $(Ca,Na_2)Al_2Si_4O_{12}.6H_2O$.
Gmelinite, $(Na_2Ca)Al_2Si_4O_{12}.6H_2O$.
Analcite, $NaAlSi_2O_6.H_2O$.
Faujasite, $H_4Na_2CaAl_4Si_{10}O_{38}.18H_2O$.
Natrolite, $Na_2Al_2Si_3O_{10}.2H_2O$.
Mesolite, $Na_2Al_2Si_3O_{10}.2H_2O + 2[CaAl_2Si_3O_{10}.3H_2O]$.
Gonnardite, $(Ca,Na_2)_2Al_2Si_5O_{15}.5\frac{1}{2}H_2O$.
Thomsonite, $(Na_2,Ca)Al_2Si_2O_8.2\frac{1}{2}H_2O$.
Hydrothomsonite, $(H_2,Na_2,Ca)Al_2Si_2O_8.5H_2O$.
Arduinite, Ca,Na, zeolite.
Echellite, $(Ca,Na_2)O.2Al_2O_3.3SiO_2.4H_2O$.
Epidesmine, $(Na_2,Ca)Al_2Si_6O_{16}.6H_2O$.
Erionite, $H_2CaK_2Na_2Al_2Si_6O_{17}.5H_2O$.
Hydronephelite, $HNa_2Al_3Si_3O_{12}.3H_2O$.
Paragonite, $H_2NaAl_3(SiO_4)_3$.
Spodiophyllite, $(Na_2,K_2)_2(Mg,Fe)_3(Fe,Al)_2(SiO_3)_8$.
Searlesite, $NaB(SiO_3)_2.H_2O$.
Molengraafite, Ca,Na, titano-silicate.
Astrophyllite, Na,K,Mn,Fe,titano-silicate.
Narsarsukite, Fe,Na,titano-silicate.
Leucosphenite, $Na_4Ba(TiO)_2(Si_2O_5)_5$.
Lorenzenite, $Na_2(TiO)_2Si_2O_7$.
Epistolite, Ti,Na,etc., niobate.
Berzeliite, $(Ca,Mg,Mn,Na_2)_3As_2O_8$.
Natrophilite, $NaMnPO_4$.
Beryllonite, $NaBePO_4$.
Ježekite, $Na_4CaAl(AlO)(F,OH)_4(PO_4)_2$.
Lacroixite, $Na_4(Ca,Mn)_4Al_3(F,OH)_4P_3O_{16}.2H_2O$.
Durangite, $Na(AlF)AsO_4$.
Fremontite, $(Na,Li)Al(OH,F)PO_4$.
Dickinsonite, Fillowite } $3(Mn,Fe,Na_2)_3P_2O_8.H_2O$.
Stercorite, $HNa(NH_4)PO_4.4H_2O$.
Soumansite, Hydrous Al,Na, fluophosphate.
SODA NITER, $NaNO_3$.
Darapskite, $NaNO_3.Na_2SO_4.H_2O$.
Nitroglauberite, $6NaNO_3.2Na_2SO_4.3H_2O$.
Borax, $Na_2B_4O_7.10H_2O$.
Ulexite, $NaCaB_5O_9.8H_2O$.
Thenardite, Na_2SO_4.
Aphthitalite, $(K,Na)_2SO_4$.
GLAUBERITE, $Na_2SO_4.CaSO_4$.
Vanthoffite, $3Na_2SO_4.MgSO_4$.
Sulphohalite, $3Na_2SO_4.NaCl.NaF$.
Caracolite, $Pb(OH)Cl.Na_2SO_4$.
Hanksite, $9Na_2SO_4.2Na_2CO_3.KCl$.
Lecontite, $(Na,NH_4,K)_2SO_4.2H_2O$.
Mirabilite, $Na_2SO_4.10H_2O$.
Löweite, $MgSO_4.Na_2SO_4.2\frac{1}{2}H_2O$.
Blödite, $MgSO_4.Na_2SO_4.4H_2O$.
Mendozite, $NaAl(SO_4)_2.12H_2O$.
Kröhnkite, $CuSO_4.Na_2SO_4.2H_2O$.
Natrochalcite, $Cu_4(OH)_2(SO_4)_2.Na_2SO_4.2H_2O$.
Ferronatrite, $3Na_2SO_4.Fe_2(SO_4)_3.6H_2O$.
Sideronatrite, $2Na_2O.Fe_2O_3.4SO_3.7H_2O$.
Metavoltine, $5(K_2,Na_2,Fe)O.3Fe_2O_3.12SO_3.18H_2O$.
Natrojarosite, $Na_2Fe_6(OH)_{12}(SO_4)_4$.
Palmierite, $3(K,Na)_2SO_4.4PbSO_4$.
Almeriite, $Na_2SO_4.Al_2(SO_4)_3.5Al(OH)_3.H_2O$.

STRONTIUM

Strontianite, $SrCO_3$.
Ancylite, $4Ce(OH)CO_3.3SrCO_3.3H_2O$.
Ambatoarinite, Rare earths, Sr, carbonate.
Brewsterite, $H_4(Sr,Ba,Ca)Al_2(SiO_3)_6.3H_2O$.
Fermorite, $(Ca,Sr)_4[Ca(OH,F)][(P,As)O_4]_3$.
Hamlinite, Sr,Al, phosphate.
Harttite, Sr,Al, phosphate and sulphate.
Celestite, $SrSO_4$.

THORIUM

Caryocerite, Tritomite } Ca,Ce,Y,Th, fluo-silicates.
Thorite, $ThSiO_4$.
Auerlite, Th silico-phosphate.
Yttrialite, Th,Y, silicate.
Mackintoshite, U,Th,Ce, silicate.
Yttrocrasite, Hydrous Y,Th, titanate.
Pyrochlore, $RNb_2O_6.R(Ti,Th)O_3$.
MONAZITE, $(Ce,La,Di)PO_4$ with ThO_2.
Thorianite, Th and U oxides.

TIN

Stannite, $Cu_2S.FeS.SnS_2$.
Canfieldite, $4Ag_2S.SnS_2$.
Teallite, $PbSnS_2$.
Franckeite, $Pb_5Sn_3FeSb_2S_{14}$.
Cylindrite, $Pb_3Sn_4FeSb_2S_{14}$.
Cassiterite, SnO_2.
Stokesite, $H_4CaSnSi_3O_{11}$.
Hielmite, Y,Fe,Mn,Ca, stanno-niobate.
Nordenskiöldine, $CaSn(BO_3)_2$.
Hulsite, $12(Fe,Mg)O.2Fe_2O_3.1SnO_2.3B_2O_3.2H_2O$.

TITANIUM

ILMENITE, $FeTiO_3$.
Senaite, $(Fe,Mn,Pb)O.TiO_2$.
Arizonite, $Fe_2O_3.3TiO_2$.
Pyrophanite, $MnTiO_3$.
Pseudobrookite, $Fe_4(TiO_4)_3$.
Rutile, TiO_2.
Octahedrite, Brookite, TiO_2.
Uhligite, $Ca(Ti,Zr)O_5.Al(Ti,Al)O_5$.
Schlorlomite, $Ca_3(Fe,Ti)_2((Si,Ti)O_4)_3$.
Titanite, $CaTiSiO_5$.
Molengraafite, Ca,Na, titano-silicate.
Keilhauite, Ca,Al,Fe,Y, titano-silicate.
Tscheffkinite, Ce, etc., titano-silicate.
Astrophyllite, Na,K,Fe,Mn, titano-silicate.
Johnstrupite, Mosandrite, Rinkite } Ce, etc., titano-silicates
Narsarsukite, Fe,Na, titano-silicate.
Neptunite, Fe,Mn,Na,K, titano-silicate.
Benitoite, $BaTiSi_3O_9$.
Leucosphenite, $Na_4Ba(TiO)_2(Si_2O_5)_5$.
Lorenzenite, $Na_2(TiO)_2Si_2O_7$.
Joaquinite, Ca,Fe, titano-silicate.
PEROVSKITE, $CaTiO_3$.
Knopite, Ca,Ce, titanate.

Dysanalyte, Ca_3Fe, titano-silicate.
Geikielite, Mg,Fe, titanate.
Delorenzite, Fe,U,Y, titanate.
Yttrocrasite, Hydrous Y, Th, titanate.
Brannerite, $(UO,TiO,UO_2)TiO_3$.
Pyrochlore, $RNb_2O_6.R(Ti,Th)O_3$.
Aeschynite, Ce, niobate-titanate.
Polymignite, Ce,Fe,Ca, niobate-titanate.
Euxenite, Polycrase, Blomstrandine-Priorite } Y,Ce,U, niobate-titanates.
Betafite, U, etc., niobate-titanate.
Epistolite, Na,Ti, etc., niobate.
Lewisite, $5CaO.2TiO_2.3Sb_2O_5$.
Mauzeliite, Pb,Ca, titano-antimonate.
Warwickite, $(Mg,Fe)_3TiB_2O_8$.

TUNGSTEN

Tungstenite, WS_2.
Tungstite, WO_3.
Wolframite, $(Fe,Mn)WO_4$.
Hübnerite, $MnWO_4$.
Scheelite, $CaWO_4$.
Cuprotungstite, $CuWO_4$.
Powellite, $Ca(Mo,W)O_4$.
Stolzite, Raspite } $PbWO_4$.
Chillagite, $3PbWO_4.PbMoO_4$.
Reinite, $FeWO_4$.
Ferritungstite, $Fe_2O_3.WO_3.6H_2O$.

URANIUM

Rutherfordine, UO_2CO_3.
Uranothallite, $2CaCO_3.U(CO_3)_2.10H_2O$.
Liebigite, Hydrous, U,Ca, carbonate.
Voglite, Hydrous, U, Ca, Cu, carbonate.
Mackintoshite, U,Th,Ce, silicate.
Uranophane, $CaO.2UO_3.2SiO_2.6H_2O$.
Delorenzite, Fe,U,Y, titanate.
Brannerite, $(UO,TiO,UO_2)TiO_3$.
Hatchettolite, U, tantalo-niobate.
Samirésite, U, etc., niobate.
Fergusonite, Y,Er,U, niobate.
Samarskite, Fe,Ca,U,Ce,Y, niobate.
Ampangabéite, U, etc., niobate.
Ånnerödite, U,Y, niobate.
Euxenite, Polycrase, Blomstrandine-Priorite } Y,Ce,U, niobate-titanates.
Betafite, U, niobate-titanate.
Plumboniobite, Y,U,Pb, niobate.
Uvanite, $2UO_3.3V_2O_5.15H_2O$.
Ferganite, $U_3(VO_4)_2.6H_2O$.
Torbernite, $Cu(UO_2)_2P_2O_8.8H_3O$.
Zeunerite, $Cu(UO_2)_2As_2O_8.8H_2O$.
Autunite, Bassetite } $Ca(UO_2)_2P_2O_8.8H_2O$.
Uranospinite, $Ca(UO_2)_2As_2O_8.8H_2O$.
Uranocircite, $Ba(UO_2)_2P_2O_8.8H_2O$.
Carnotite, $K_2O.2U_2O.V_2O_5.3H_2O$.
Tyuyamunite, $CaO.2UO_3.V_2O_5.4H_2O$.
Uranospathite, Hydrous uranyl phosphate.
Phosphuranylite, $(UO_2)_3P_2O_8.6H_2O$.
Trögerite, $(UO_2)_3As_2O_8.12H_2O$.
Walpurgite, $Bi_{10}(UO_2)_3(OH)_{24}(AsO_4)_4$.
Uraninite, Uranyl, etc., uranate.
Gummite, alteration of uraninite.
Thorianite, Th and U oxides.
Uranosphærite, $(BiO)_2U_2O_7.3H_2O$.
Johannite, Hydrous Cu,U, sulphate.
Gilpinite, $(Cu,Fe,Na_2)O.UO_3.SO_3.4H_2O$.
Uranopilite, $CaU_8S_2O_{31}.25H_2O$.

VANADIUM

Patronite, VS_4.
Sulvanite, $3Cu_2S.V_2S_5$.
Alaïte, $V_2O_5.H_2O$.
Ardennite, Al,Mn,V, silicate.
Roscoëlite, Vanadium mica.
Pucherite, $BiVO_4$.
Vanadinite, $Pb_4(PbCl)(VO_4)_3$.
Descloizite, $(Pb,Zn)_2(OH)VO_4$.
Pyrobelonite, $4PbO.7MnO.2V_2O_5.3H_2O$.
Dechenite, PbV_2O_6.
Calciovolborthite, $(Cu,Ca)_3V_2O_8.(Cu,Ca)(OH)_2$.
Turanite, $5CuO.V_2O_5.2H_2O$.
Psittacinite, Mottramite } Pb,Cu, vanadates.
Uvanite, $2UO_3.3V_2O_5.15H_2O$.
Ferganite, $U_3(VO_4)_2.6H_2O$.
Fernandinite, $CaO.V_2O_4.5V_2O_5.14H_2O$.
Pascoite, $2CaO.3V_2O_5.11H_2O$.
Pintadoite, $2CaO.V_2O_5.9H_2O$.
Hewettite, Metahewettite } $CaO.3V_2O_5.9H_2O$.
Volborthite, Hydrous, Cu,Ba,Ca, vanadate.
Hügelite, Hydrous, Pb,Zn, vanadate.
Carnotite, $K_2O.2U_2O_3.V_2O_5.3H_2O$.
Tyuyamunite, $CaO.2UO_3.V_2O_5.4H_2O$.
Minasragrite, $(V_2O_2)H_2(SO_4)_3.15H_2O$.

YTTRIUM, Etc.

Yttrofluorite, $(Ca_3,Y_2)F_6$.
Yttrocerite, $(Y,Er,Ce)F_3.5CaF_2.H_2O$.
Tengerite, Y carbonate.
Cappelenite, Y,Ba, boro-silicate.
Melanocerite, Caryocerite, Steenstrupine } Ca,Y,Ce, fluo-silicates.
Tritomite, Th,Ce,Y,Ca, fluo-silicate.
Gadolinite, $Be_2FeY_2Si_2O_{10}$.
Yttrialite, Th,Y, silicate.
Rowlandite, Y silicate.
Thalénite, Y silicate
Thortveitite, $(Sc,Y)_2Si_2O_7$.
Cenosite, $H_4Ca_2(Y,Er)_2CSiO_{17}$.
Keilhauite, Ca,Al,Fe,Y, titano-silicate.
Delorenzite, Fe,U,Y, titanate.
Yttrocrasite, Hydrous Y,Th, titanate.
Risörite, Y niobate.
Fergusonite, Y,Er, niobate.
Sipylite, Er niobate.
Yttrotantalite, Y, etc., tantalate-niobate.

Samarskite, Fe,Ca,U,Ce,Y, niobate-tantalate.
Ånnerödite, U,Y, niobate.
Hielmite, Y,Fe,Mn,Ca, stanno-tantalate.
Euxenite, Polycrase, Blomstrandine-Priorite } Y,Ce,U, niobate-titanates.
Plumboniobite, Y,U,Pb,Fe, niobate.
XENOTIME, YPO_4.
Retzian, Y,Mn,Ca, arsenate.
Rhabdophanite, Hydrous Ce,Y, phosphate.

ZINC

Sphalerite, ZnS.
Wurtzite, ZnS.
Voltzite, Zn_5S_4O.
ZINCITE, ZnO.
Gahnite, $ZnO.Al_2O_3$.
FRANKLINITE, $(Fe,Zn,Mn)O.(Fe,Mn)_2O_3$.
Chalcophanite, $(Mn,Zn)O.2MnO_2.2H_2O$.
Hetærolite, $2ZnO.2Mn_2O_3.1H_2O$.
Smithsonite, $ZnCO_3$.
Rosasite, $2CuO.CuCO_3.5ZnCO_3$?
Aurichalcite, $2(Zn,Cu)CO_3,3(Zn,Cu)(OH)_2$.
Hydrozincite, $ZnCO_3.2Zn(OH)_2$.
Hardystonite, $Ca_2ZnSi_2O_7$.
Danalite, $(Be,Fe,Zn,Mn)_7Si_3O_{12}S$.
Willemite, Zn_2SiO_4.
Calamine, H_2ZnSiO_5.
Clinohedrite, $H_2CaZnSiO_5$.
Hodgkinsonite, $3(Zn,Mn)O.SiO_2.H_2O$.
Gageite, Hydrous, Mn, Mg, Zn, silicate.
Tarbuttite, $Zn_3P_2O_8.Zn(OH)_2$.
Adamite, $Zn_2(OH)AsO_4$.
Descloizite, $(Pb,Zn)_2(OH)VO_4$.
Hopeite, Parahopeite } $Zn_3P_2O_8.4H_2O$.
Köttigite, $Zn_3As_2O_8.8H_2O$.
Barthite, $3ZnO.CuO.3As_2O_5.2H_2O$.
Hügelite, Hydrous, Pb, Zn, vanadate
Spencerite, $Zn_3(PO_4)_2.Zn(OH)_2.3H_2O$.
Hibbenite, $2Zn_3(PO_4)_2.Zn(OH)_2.6\frac{1}{2}H_2O$.
Veszelyite, Hydrous, Cu, Zn, phospho-arsenate.
Kehocite, Hydrous, Al, Zn, phosphate.
Sussexite, $H(Mn,Zn,Mg)BO_3$.
Zinkosite, $ZnSO_4$.
Ilesite, $(Mn,Zn,Fe)SO_4.4H_2O$.
Goslarite, $ZnSO_4.7H_2O$.
Dietrichite, $(Zn,Fe,Mn)SO_4.Al_2(SO_4)_3.22H_2O$.
Serpierite, Hydrous, Cu, Zn, sulphate.
Zincaluminite, $2ZnSO_4.4Zn(OH)_2.6Al(OH)_3.5H_2O$.

ZIRCONIUM

Baddeleyite, ZrO_2.
Uhligite, $Ca(Ti,Zr)O_5.Al(Ti,Al)O_5$.
Rosenbuschite, Na,Ca,Zr, silicate.
Wöhlerite, Na,Ca,Zr, silicate and niobate.
Låvenite, Mn,Ca,Zr, silicate.
Hiortdahlite, $(Na_2,Ca)(Si,Zr)O_3$.
Eudialyte, Zr,Fe,Ca,Na, silicate.
Elpidite, $Na_2O.ZrO_2.6SiO_2.3H_2O$.
Catapleiite, $H_4(Na_2,Ca)ZrSi_3O_{11}$.
Zircon, $Zr\ SiO_4$.
Chalcolamprite, $R''Nb_2O_6.R''SiO_3$.

TABLE II. MINERALS ARRANGED ACCORDING TO THEIR SYSTEM OF CRYSTALLIZATION.

The following lists are intended to include all well-recognized species, whose crystallization is known, arranged according to the system to which they belong, and further classified by their luster and specific gravity; the hardness is also given in each case.

I. CRYSTALLIZATION ISOMETRIC.*

A. Luster Nonmetallic.

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Sal Ammoniac (p. 397)	1·53	1·5–2	Arsenolite (p. 409)	3·7	1·5
Kalinite (p. 637)	1·75	2–2·5	Schorlomite (p. 510)	3·81–3·88	7–7·5
Faujasite (p. 555)	1·92	5	Betafite (p. 591)	3·75–4·17	
Sylvite (p. 396)	1·98	2	Hercynite (p. 420)	3·9–3·95	7·5–8
Halite (p. 395)	2·14	2·5	**Sphalerite** (p. 367)	3·9–4·1	3·5–4
Hydrophilite (p. 399)	2·2		Nantokite (p. 395)	3·93	2–2·5
Sodalite (p. 502)	2·14–2·30	5·5–6	Marshite (p. 395)	5·6?	
Analcite (p. 554)	2·2–2·3	5–5·5	Alabandite (p. 369)	3·95–4·04	3·5–4
Noselite (p. 503)	2·25–2·4	5·5	Perovskite (p. 586)	4·03	5·5
Northupite (p. 450)	2·38	3·5–4	Berzeliite (p. 593)	4·08	5
Hauynite (p. 503)	2·4–2·5	5·5–6	**Gahnite** (p. 420)	4·0–4·6	7·5–8
Leucite (p. 469)	2·45–2·50	5·5–6	Pyrochlore (p. 587)	4·2–4·36	5–5·5
Lazurite (p. 503)	2·38–2·45	5–5·5	Koppite (p. 587)	4·45–4·56	
Sulphohalite (p. 631)	2·49	3·5	Zirkelite (p. 428)	4·71	5·5
Tychite (p. 450)	2·5	3·5	Hatchettolite (p. 587)	4·8–4·9	5
Ralstonite (p. 402)	2·58	4·5	Lewisite (p. 618)	4·95	5·5
Voltaite (p. 639)	2·79	3–4	Atopite (p. 618)	5·03	5·5–6
Villiaumite (p. 396)	2·81		Percylite, Boleite (p. 401)	5·08	2·5
Langbeinite (p. 625)	2·83		Mauzeliite (p. 618)	5·11	6–6·5
Zunyite (p. 505)	2·87	7	Manganosite (p. 411)	5·18	5–6
Pollucite (p. 470)	2·90	6·5	Neotantalite (p. 587)	5·2	3·8
Boracite (p. 620)	2·9–3	7	Senarmontite (p. 409)	5·2–5·3	2–2·5
Pharmacosiderite, (p. 614)	2·9–3	2·5	Samirésite (p. 587)	5·24	
Plazolite (p. 580)	3·13	6·5	Embolite (p. 397)	5·3–5·4	1–1·5
Nitrobarite (p. 619)	3·2		**Cerargyrite** (p. 397)	5·55	1–1·5
Fluorite (p. 398)	3·2	4	Miersite (p. 598)	5·6	
Helvite (p. 504)	3·16–3·36	6–6·5	Microlite (p. 587)	5·5–6·1	5·5
Garnet (p. 505)	3·3–4·3	6·5–7·5	Iodobromite (p. 397)	5·71	1–1·5
Rhodizite (p. 621)	3·4	8	Bromyrite (p. 397)	5·8–6	2–3
Danalite (p. 504)	3·43	5·5–6	**Cuprite** (p. 410)	5·85–6·15	3·5–4
Hauerite (p. 378)	3·46	4	**Eulytite** (p. 504)	6·11	4·5
Diamond (p. 345)	3·52	10	Bunsenite (p. 411)	6·4	5·5
Yttrofluorite (p. 399)	3·55	4·5	Monimolite (p. 593)	6·58;7·29	5–6
Spinel (p. 419)	3·5–4·1	8	Eglestonite (p. 401)	8·3	2–3
Periclase (p. 411)	3·67	6	Mosesite (p. 402)		3

* Some pseudo-isometric species are here included. Species with submetallic luster are placed under B, but some species are included in both lists.

B. LUSTER METALLIC (AND SUBMETALLIC).

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Hauerite (p. 378)	3·46	4	Canfieldite (p. 394)	6·28	2·5–3
Sphalerite (p. 367)	3·9–4·1	3·5–4	Ullmannite (p. 379)	6·2–6·7	5–5·5
Alabandite (p. 369)	3·95–4·04	3·5–4	**Smaltite,** Chloanthite (p. 378)	6·4–6·6	5·5–6
Cubanite (p. 374)	4·0–4·1	4	Skutterudite (p. 380)	6·7–6·86	6
Dysanalyte (p. 586)	4·13	5–6	Willyamite (p. 379)	6·87	5·5
Chromite (p. 423)	4·3–4·57	5·5	Polyargyrite (p. 562)	6·97	2·5
Villamaninite (p. 379)	4·4	4·5	Laurite (p. 379)	7·0	7·5
Tennantite (p. 391)	4·4–4·49	3–4	**Argentite** (p. 364)	7·2–7·36	2–2·5
Tetrahedrite (p. 390)	4·4–5·1	3–4	IRON (p. 356)	7·3–7·8	4–5
Magnesioferrite (p. 420)	4·57–4·65	6–6·5	**Galena** (p. 363)	7·4–7·6	2·5–3
Polydymite (p. 373)	4·5–4·8	4·5	Eucairite (p. 365)	7·5	2·5
Cobaltnickelpyrite (p. 378)	4·71	5	Metacinnabarite (p. 369)	7·8	3
Jacobsite (p. 421)	4·75	6	Clausthalite (p. 364)	7·6–8·8	2·5–3
Sychnodymite (p. 373)	4·76		Naumannite (p. 364)	8·0	2·5
LINNÆITE (p. 374)	4·8–5	5·5	Altaite (p. 364)	8·16	3
Carrollite (p. 374)	4·85	5·5	Tiemannite (p. 369)	8·2–8·5	2·5
Bixbyite (p. 425)	4·95	6–6·5	Hessite (p. 365)	8·3–8·5	2·5–3
PENTLANDITE (p. 369)	5·0	3·5–4	**Copper** (p. 353)	8·8–8·9	2·5–3
Pyrite (p. 377)	4·95–5·10	6–6·5	**Uraninite** (p. 623)	9–9·7	5·5
Franklinite (p. 420)	5·07–5·22	6–6·5	Thorianite (p. 624)	9·3	
Magnetite (p. 420)	5·18	6–6·5	**Silver** (p. 352)	10·1–11·1	2·5–3
Bornite (p. 374)	4·9–5·4	3	Sperrylite (p. 379)	10·6	6–7
Gersdorffite (p. 379)	5·6–6·2	5·5	Lead (p. 354)	11·4	1·5
Cuprite (p. 410)	5·85–6·15	3·5–4	Palladium (p. 355)	11·3–11·8	4·5–5
Brongniardite (p. 387)	5·95	3·5	AMALGAM (p. 354)	13·7–14·1	3–3·5
Corynite (p. 379)	5·95–6·03	4·5–5	**Platinum** (p. 355)	14–19	4–4·5
Argyrodite (p. 391)	6·1–6·2	2·5	**Gold** (p. 350)	15·6–19·3	2·5–3
Cobaltite (p. 379)	6–6·3	5·5	Iridium (p. 355)	22·6–22·8	6–7

II. CRYSTALLIZATION TETRAGONAL.

A. Luster Nonmetallic.

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Mellite (p. 645)	1·64	2–2·5	Hardystonite (p. 498)	3·4	3–4
Darapskite (p. 619)			**Torbernite** (p. 648)	3·4–3·6	2–2·5
Pinnoite (p. 622)	2·29		Trippkeite (p. 618)		
Apophyllite (p. 546)	2·3–2·4	4·5–5	**Octahedrite** (p. 428)	3·8–3·95	5·5–6
Löweite (p. 637)	2·38	2·5–3	**Rutile** (p. 427)	4·18–4·25	6–6·5
Ecdemite (p. 618)	6·9–7·1	2·5–3	**Xenotime** (p. 592)	4·45–4·56	4–5
Sarcolite (p. 518)	2·54–2·93	6	Powellite (p. 643)	4·53	3·5
Marialite (p. 518)	2·57	5·5–6	**Thorite** (p. 522)	4·4–5·4	4·5–5
Mizzonite (Dipyre), (p. 517)	2·62	5·5–6	Fergusonite (p. 588)	4·4–5·8	5·5–6
Wernerite (Scapolite), (p. 516)	2·66–2·73	5·5–6	**Zircon** (p. 520)	4·68–4·7	7·5
Meionite (p. 516)	2·70–2·74	5·5–6	Romeite (p. 618)	4·71	5·5–6
Edingtonite (p. 555)	2·70	4–4·5	Sipylite (p. 588)	4·89	6
Narsarsukite (p. 585)	2·7	7·0	Nasonite (p. 498)	5·4	4
Chiolite (p. 400)	2·84–2·99	3·5–4	Ganomalite (p. 498)	5·74	3
Soumansite (p. 614)	2·87	4·5	**Scheelite** (p. 642)	5·9–6·1	4·5–5
Melilite (p. 518)	2·9–3·1	5	**Phosgenite** (p. 450)	6–6·09	2·75–3
Gehlenite (p. 518)	2·9–3·1	5·5–6	**Calomel** (p. 395)	6·48	1–2
Meliphanite (p. 496)	3·01	5–5·5	**Wulfenite** (p. 643)	6·7–7·0	2·75–3
Sellaite (p. 399)	2·97–3·15	5	**Cassiterite** (p. 425)	6·8–7·1	6–7
Zeunerite (p. 616)	3·2	2–2·5	Matlockite (p. 401)	7·2	2·5–3
Pinnoite (p. 622)	3·27–3·37	3–4	Tapiolite (p. 590)	7·36–7·5	6
Vesuvianite (p. 519)	3·35–3·45	6·5	Larettoite (p. 401)	7·6	3
			Stolzite (p. 643)	7·87–8·13	2·75–3

B. Luster Metallic (and Submetallic).

Chalcopyrite (p. 374)	4·1–4·3	3·5–4	Polianite (p. 427)	4·84–5·0	6–6·5
Stannite (p. 394)	4·3–4·5	4	Reinite (p. 644)	6–6·4	4
Rutile (p. 427)	4·18-4·25;5·2	6–6·5	Hauchecornite (p. 372)	6·4	5
Fergusonite (p. 588)	4·4–5·8	5·5–6	Tapiolite (p. 590)	7·36–7·5	6
Hausmannite (p. 424)	4·7–4·86	5–5·5	Maucherite (p. 362)	7·83	5
Braunite (p. 425)	4·75–4·82	6–6·5	Plattnerite (p. 428)	8·5	5–5·5

III. CRYSTALLIZATION HEXAGONAL.*

Rhombohedral species are distinguished by a letter R.

A. Luster Nonmetallic.

	Specific Gravity.	Hardness.
Ice (p. 411)	0·9	1·5
Cyprusite? (p. 639)	1·75	2
Ettringite (p. 640)	1·75	2–2·5
Thaumasite (p. 581)	1·88	3·5
Koenenite (p. 401)R	2·0	2·0
Gmelinite (p. 554) R	2·04–2·17	4·5
Pyroaurite (p. 455) R	2·07	2–3
Coquimbite (p. 637) R	2·09	2–2·5
Utahite (p. 639) R		
Chabazite (p. 552) R	2·08–2·16	4–5
Levynite (p. 554) R	2·09–2·16	4–4·5
Hydronephelite? (p. 558)	2·26	4·5–6
Soda niter (p. 619) R	2·26	1·5–2
Tridymite (p. 407)	2·28–2·33	7
Rinneite (p. 399) R	2·3	3
Brucite (p. 434) R	2·38–2·4	2·5
Cancrinite (p. 501)	2·42–2·5	5–6
Microsommite (p. 501)	2·44	6
Kaliophilite (p. 501)	2·49	6
Carphosiderite? (p. 539) R	2·50	4–4·5
Colerainite (p. 583)	2·51	2·5–3
Metavoltine (p. 639)	2·53	2·5
Chalcophyllite (p. 612) R	2·44–2·66	2
Nephelite (p. 499)	2·55–2·65	5·5–6
Hanksite (p. 631)	2·56	3–3·5
Ferronatrite (p. 638) R	2·56	2
Milarite (p. 455)	2·57	5·5–6
Spodiophyllite (p. 572)	2·6	3–3·2
Aphthitalite (p. 624) R	2·64	3–3·5
Quartz (p. 403) R	2·65	7
Beryl (p. 495)	2·64–2·7; 2·80	7·5–8
Eucryptite (p. 500)	2·67	
Alunite (p. 639) R	2·67	3·5–4
Penninite (pseu.) (p. 570) R	2·6–2·85	2·25
Calcite (p. 438) R	2·71	3
Nepouite (p. 515)	2·5–3·2	2–2·5
Alumian (p. 632)	2·74	2–3
Catapleiite (p. 496)	2·8	6
Dolomite (p. 442) R	2·8–2·9	3·5–4
Martinite (p. 611) R	2·89	
Eudialyte (p. 496) R	2.91–2·93	5–5·5
Ankerite (p. 443) R	2·95–3·1	3·5–4
Phenacite (p. 514) R	2·97–3·0	7·5–8
Tourmaline (p. 540) R	2·98–3·20	7–7·5
Bityite (p. 558)	3·0	5·5
Magnesite (p. 443) R	3·0–3·12	3·5–4·5
Pyrosmalite (p. 515) R	3·06–3·19	4–4·5
Friedelite (p. 515) R	3·07	4–5
Podolite (p. 618)	3·1	
Spangolite (p. 631) R	3·14	2
Apatite (p. 595)	3·17–3·23	5
Harttite (p. 601)	3·2	4·5–5
Jarosite (p. 640) R	3·20	2·5–3·5
Raimondite (p. 639)	3·20	3
Wilkeite (p. 597)	3·23	5
Hamlinite (p. 601) R	3·23	4·5
Pyrochroite (p. 435) R	3·26	2·5
Jeremejevite (p. 620)	3·28	6·5
Dioptase (p. 515) R	3·28–3·35	5
Svanbergite (p. 618) R	3·30	5
Cronstedtite (p. 571) R	3·35	3·5
Hematolite (p. 606) R	3·35	3·5
Connellite (p. 631)	3·36	3
Mesitite (p. 443) R	3·33–3·42	3·5–4
Rhodochrosite (444) R	3·45–3·60	3·5–4·5
Svabite (p. 598)	3·52	5
Fermorite (p. 597)	3·52	5
Florencite (p. 601) R	3·58	5
Benitoite (p. 585)	3·6	6·2–6·5
Siderite (p. 443) R	3·83–3·88	3·5–4
Rhabdophanite (p. 609) R	3·94–4·01	3·5
Wurtzite (p. 371)	3·98	3·5–4
Corundum (p. 413) R	3·95–4·10	9
Willemite (p. 513) R	3·94–4·19	5·5
Geikielite (p. 586) R	4·0	6·0
Sphærocobaltite (446)R	4·02–4·13	4
Melanocerite (p. 496) R	4·13	5–6
Tritomite (p. 496) R	4·20	5·5
Nordenskiöldine (620)R	4·20	5·5–6
Caryocerite (p. 496) R	4·29	5–6
Parisite (p. 621)	4·36	4·5
Smithsonite (p. 445) R	4·30–4·45	5
Beudantite (p. 618) R	4–4·3	3·5–4·5
Plumbogummite? (p. 601)	4–4·9	4–5
Britholite (p. 580)	4·4	5·5
Cappelenite (p. 496)	4·41	6–6·5
Pyrophanite (p. 418)	4·5	5
Hinsdalite (p. 618)	4·65	4·5
Molybdophyllite (p. 498)	4·7	3–4
Bastnäsite (p. 449)	4·9	4·5
Greenockite (p. 371)	4·9–5·0	3–3·5
Hematite (p. 415) R	4·9–5·3	5·5–6·5
Xanthoconite (p. 393) R	5–5·2	2
Zincite (p. 411)	5·4–5·7	4–4·5
Bellite (p. 631)	5·5	2·5
Proustite, (p. 389) R	5·6	2–2·5
Iodyrite (p. 397)	5·6–5·7	1–1·5
Fluocerite (p. 399)	5·7–5·9	4
Pyrargyrite (p. 389) R	5·85	2·5
Penfieldite (p. 401)		
Barysilite (p. 498)	6·11	3
Tysonite (p. 399)	6·13	4·5–5
Pyromorphite (p. 597)	6·5–7·1	3·5–4
Vanadinite (p. 598)	6·66–6·86	3
Mimetite (p. 598)	7·0–7·25	3·5
Kleinite (p. 395)	8·0	3·5
Cinnabar (p. 370) R	8·08–8·2	2–2·5

* Some pseudo-hexagonal species are included.

B. LUSTER METALLIC (AND SUBMETALLIC).

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Graphite (p. 347) R.	2·1–2·2	1–1·5	**Pyrargyrite** (p. 389) R.	5·85	2·5
Chalcophanite (p. 435) R	3·91	2·5	Tellurium (p. 349) R.	6·1–6·3	2–2·5
Ilmenite (p. 417) R.	4·5–5	5–6	Allemontite (p. 349) R.	6·2	3·5
COVELLITE (p. 371)	4·6	1·5–2	ANTIMONY (p. 349) R.	6·7	3–3·5
Pyrrhotite (p. 373)	4·6	3·5–4·5	Tetradymite (p. 360) R.	7·2–7·6	1·5–2
Molybdenite (p. 360)	4·7–4·8	1–1·5	**Niccolite** (p. 372)	7·3–7·67	5–5·5
Langbanite (p. 539)	4·92	6·5	Breithauptite (p. 372)	7·54	5·5
Xanthoconite (p. 393)	5		Platynite (p. 385) R.	8	2–3
Hematite (p. 415) R.	5·2–5·3	5·5–6·5	**Cinnabar** (p. 370) R.	8·0–8·2	2–2·5
Senaite (p. 418) R.	5·3	6	BISMUTH (p. 349) R.	9·7–9·8	2–2·5
Millerite (p. 372) R.	5·3–5·65	3–3·5	**Iridosmine** (p. 355) R.	19·3–21·1	6–7
ARSENIC (p. 348) R.	5·6–5·7	3·5			

IV. CRYSTALLIZATION ORTHORHOMBIC.

A. LUSTER NONMETALLIC.

Teschemacherite (p. 450)	1·45	1·5	Edingtonite (p. 555)	2·69	4–4·5
Thermonatrite (p. 452)	1·5–1·6	1–1·5	Hillebrandite (p. 546)	2·7	5·5
Carnallite (p. 401)	1·6	1–1·5	Hopeite (p. 607)	2·76	2·5–3
Struvite (p. 606)	1·65–1·7	2	Phosphosiderite (p. 610)	2·76	3·75
Epsomite (p. 635)	1·75	2–2·5	**Talc** (p. 575)	2·7–2·8	1–1·5
Mascagnite (p. 624)	1·77	2–2·5	Beryllonite (p. 595)	2·84	5·5–6
Nesquehonite (p. 452)	1·84	2·5	Haidingerite (p. 610)	2·85	1·5–2·5
Goslarite (p. 635)	2·0	2–2·25	Strengite (p. 610)	2·87	3–4
Erionite (p. 558)	1·99		**Prehnite** (p. 534)	2·8–2·95	6–6·5
Morenosite (p. 635)	1·9–2·1	2–2·5	Guarinite (p. 525)	2·9–3·3	6·5
Sulphur (p. 347)	2·07	1·5–2·5	**Anhydrite** (p. 629)	2·90–2·98	3–3·5
Lindackerite (p. 618)	2·0–2·5	2–2·5	**Aragonite** (p. 446)	2·94	3·5–4
Newberyite (p. 611)	2·10	3–3·5	Spodiosite? (p. 600)	2·94	4
Stellerite (p. 558)	2·12	3·5–4	Leucophanite (p. 496)	2·96	5
Niter (p. 619)	2·09–2·14	2	Cebollite (p. 518)	2·96	5·0
Sideronatrite (p. 639)	2·15	2–2·5	**Danburite** (p. 522)	2·97–3·02	7–7·25
Epidesmine (p. 558)	2·16		Bementite (p. 582)	2·98	
Fluellite (p. 402)	2·17	3	Hopeite (p. 607)	3·0–3·1	3·2
Natrolite (p. 556)	2·20–2·25	5–5·5	Tyrolite (p. 612)	3·0–3·1	1·5
Okenite? (p. 546)	2·28	4–5·5	Harstigite (p. 535)	3·05	5·5
Felsöbanyite (p. 639)	2·33	1·5	Reddingite (p. 607)	3·10	3–3·5
Thomsonite (p. 557)	2·3–2·4	5–5·5	Lawsonite (p. 540)	3·08	7·5–8
Wavellite (p. 612)	2·33	3·5–4	Grothine (p. 545)	3·09	
Hambergite (p. 620)	2·35	7·5	**Humite** (p. 536)	3·1–3·2	6–6·5
Pirssonite (p. 452)	2·35	3·35	**Anthophyllite** (p. 486)	3·1–3·2	5·5–6
Sulfoborite (p. 623)	2·38–2·45	4	**Andalusite** (p. 524)	3·16–3·2	7·5
Dawsonite (p. 452)	2·40		**Enstatite** (p. 472)	3·15–3·3	5·5
Fischerite (p. 613)	2·46	5	**Autunite** (p. 616)	3·05–3·19	2–2·5
Peganite (p. 613)	2·50	3–3·5	Monticellite (p. 513)	3·03–3·25	5–5·5
Variscite (p. 610)		4	Eosphorite (p. 615)	3·11–3·15	5
Lucinite (p. 610)	2·52	5	Childrenite (p. 615)	3·18–3·24	4·5–5
Elpidite (p. 496)	2·52–2·59	6·5–7	**Sillimanite** (p. 526)	3·24	6–7
Howlite? (p. 621)	2·55	3·5	**Scorodite** (p. 609)	3·1–3·3	3·5–4
Bertrandite (p. 539)	2·6	6–7	Lossenite (p. 619)		
Lanthanite (p. 453)	2·6	2·5–3	**Forsterite** (p. 513)	3·2–3·33	6–7
Iolite (p. 497)	2·6–2·66	7–7·5	Dumortierite (p. 543)	3·26	7
Thenardite (p. 624)	2·68–2·69	2–3	Kornerupine (p. 544)	3·27	6·5

A. Luster Nonmetallic

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Zoisite (p. 530)	3·25–3·37	6–6·5	Barylite (p. 498)	4·03	7
Dufrenite (p. 605)	3·23–3·4	3·5–4	**Tephroite** (p. 513)	4–4·12	5·5–6
Chrysolite (p. 511)	3·27–3·37	6·5–7	Carminite (p. 594)	4·105	2·5
Warwickite (p. 621)	3·35	3–4	Ampangabéite (p. 591)	3·97–4·29	4·0
Euchroite (p. 611)	3·39	3·5–4	Fayalite (p. 513)	4–4·14	6·5
Astrophyllite (p. 585)	3·3–3·4	3	Retzian (p. 606)	4·15	4
Diaspore (p. 431)	3·3–3·5	6·5–7	Olivenite (p. 603)	4·1–4·4	3
Lorenzenite (p. 586)	3·4	6·0	Hulsite (p. 622)	4·3	3
Purpurite (p. 610)	3·4	4–4·5	**Witherite** (p. 447)	4·3–4·35	3–3·75
Natrophilite (p. 594)	3·41	4·5–5	Adamite (p. 604)	4·34–4·35	3·5
Cenosite (p. 580)	3·41	5·5	Pseudobrookite (p. 424)	4·4–5	
Gerhardtite (p. 619)	3·43	2	**Barite** (p. 625)	4·5	2·5–3·5
Hypersthene (p. 473)	3·4–3·5	5·5	Derbylite (p. 618)	4·53	5
Uranospinite (p. 617)	3·45	2–3	Euxenite (p. 591)	4·6–5	6·5
Guarinite (p. 525)	3·49	6	Yttrocrasite (p. 586)	4·8	5·5–6
Calamine (p. 539)	3·4–3·5	4·5–5	Cerite (p. 540)	4·86	5·5
Lithiophilite (p. 594)	3·42–3·56	4·5–5	Blomstrandine (p. 591)	4·8–4·9	
Topaz (p. 523)	3·4–3·65	8	Æschynite (p. 591)	4·93;5·17	5–6
Langite (p. 638)	3·49	2·5–3	Polycrase (p. 591)	4·97–5·04	5–6
Erikite (p. 580)	3·5	5·5	Cotunnite (p. 399)	5·24–5·8	2
Uranocircite (p. 617)	3·53		Pyrobelonite (p. 604)	5·38	3·5
Triphylite (p. 594)	3·52–3·55	4·5–5	Valentinite (p. 410)	5·57	2·5–3
Epididymite (p. 455)	3·55	5·5	**Samarskite** (p. 590)	5·6–5·8	5–6
Mazapilite (p. 615)	3·57	4·5	Yttrotantalite (p. 590)	5·5–5·9	5–5·5
Thortveite (p. 529)	3·57	6–7	Melanotekite (p. 539)	5·7	6·5
Hemafibrite (p. 611)	3·50–3·65	3	Annerödite (p. 591)	5·7	6
Chrysoberyl (p. 423)	3·5–3·8	8·5	Phœnicochroite? (p. 630)	5·75	3–3·5
Aurichalcite (p. 451)	3·54–3·64		Tellurite (p. 410)	5·9	2
Ardennite (p. 539)	3·62	6–7	Descloizite (p. 604)	5·9–6·2	3·5
Libethenite (p. 603)	3·6–3·8	4	Tsumebite (p. 604)	6·1	3·5
Staurolite (p. 543)	3·65–3·75	7–7·5	Kentrolite (p. 539)	6·19	5
Strontianite (p. 447)	3·68–3·71	3·5–4	**Anglesite** (p. 628)	6·12–6·39	2·75–3
Bromlite (p. 447)	3·72	4–4·5	Pucherite (p. 594)	6·25	4
Atacamite (p. 400)	3·76	3–3·5	**Caledonite** (p. 632)	6·4	2·5–3
Uranophane (p. 581)	3·81–3·9	2·3	Daviesite (p. 401)		
Flinkite (p. 606)	3·87	4–4·5	Laurionite (p. 401)		3–3·5
Serpierite (p. 638)			**Cerussite** (p. 448)	6·46–6·57	3–3·5
Brochantite (p. 632)	3·91	3·5–4	Nadorite (p. 618)	7·02	3·5–4
Brookite (p. 429)	3·87–4·07	5·5–6	Ochrolite (p. 618)		
Pinakiolite (p. 620)	3·88	6	Mendipite (p. 401)	7–7·1	2·5–3
Ancylite (p. 449)	3·9	4·5	Georgiadésite (p. 594)	7·1	3·5
Celestite (p. 627)	3·95–3·97	3–3·5	Stibiotantalite (p. 590)	6·0–7·4	5·5
Ludwigite (p. 620)	3·91–4·02	5	Montroydite (p. 412)		1·5–2
Knebelite (p. 513)	3·9–4·1	6·5			

B. Luster Metallic (and Submetallic).

Brookite (p. 429)	3·87–4·07	5·5–6	**Stibnite** (p. 358)	4·5–4·6	2
Ilvaite[(p. 538)	4·0–4·05	5·5–6	Famatinite (p. 393)	4·57	3·5
Göthite (p. 431)	4·0–4·4	5–5·5	Klaprotholite (p. 386)	4·6	2·5
Sternbergite (p. 367)	4·1–4·2	1–1·5	Hutchinsonite (p. 386)	4·6	1·5–2
Manganite (p. 432)	4·2–4·4	4	Euxenite (p. 591)	4·6–5	6·5
Enargite (p. 393)	4·43–4·45	3	Chalmersite (p. 366)	4·7	3·5
Wittichenite (p. 388)	4·5		Chalcostibite (p. 386)	4·75–5	3–4

B. Luster Metallic (and Submetallic).

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Pyrolusite (p. 430)	4·73–4·86	2–2·5	Kentrolite (p. 539)	6·19	5
Polymignite (p. 591)	4·77–4·85	6·5	Aikinite (p. 388)	6·1–6·8	2–2·5
Stylotypite (p. 388)	4·8	3	Stromeyerite (p. 366)	6·15–6·3	2·5–3
Marcasite (p. 380)	4·85–4·9	6–6·5	Stephanite (p. 392)	6·2–6·3	2–2·5
Æschynite (p. 591)	4·93; 5·17	5–6	Guanajuatite (p. 359)	6·25–6·6	2·5–3·5
Urbanite (p. 477)	5·3	3·5	Mullanite (p. 388)	6·3	3·5
Zinkenite (p. 385)	5·3–5·35	3–3·5	Geocronite (p. 392)	6·3–6·45	2·5
Andorite (p. 385)	5·34		Wolfachite (p. 382)	6·37	4·5–5
Sartorite (p. 385)	5·39	3	Emplectite (p. 386)	6·3–6·5	2
Columbite (p. 588)	5·36–6·0	6	Teallite (p. 394)	6·4	1–2
Rathite (p. 386)	5·4	3	Meneghinite (p. 391)	6·4	2·5
Dufrenoysite (p. 387)	5·55	3	Bismuthinite (p. 359)	6·4–6·5	2
Chalcocite (p. 366)	5·5–5·8	2·5–3	Schapbachite (p. 387)	6·43	3·5
Yttrotantalite (p. 590)	5.5–5·9	5–5·5	Alloclasite (p. 382)	6·6	4·5
Annerödite (p. 591)	5·7	6	Cosalite (p. 387)	6·4–6·75	2·5–3
Melanotekite (p. 539)	5·7	6·5	**Nagyagite** (p. 383)	6·85–7·2	1–1·5
Bournonite (p. 388)	5·7–5·9	2·5–3	Rammelsbergite (p. 382)	6·9–7·2	5·5–6
Seligmanite (p. 388)		3	Safflorite (p. 382)	6·9–7·3	4·5–5
Boulangerite (p. 387)	5·75–6·0	2·5–3	**Tantalite** (p. 588)	7–7·3	6
Hielmite (p. 591)	5·82	5	Löllingite (p. 381)	7·0–7·4	5–5·5
Diaphorite (p. 387)	5·9	2·5–3	Acanthite (p. 367)	7·2–7·3	2–2·5
Glaucodot (p. 382)	5·9–6·0	5	Krennerite (p. 383)	8·35	
Arsenopyrite (p. 381)	5·9–6·2	5·5–6	Dyscrasite (p. 361)	9·4–9·8	3·5–4

V. CRYSTALLIZATION MONOCLINIC.

A. Luster Nonmetallic.

Natron (p. 452)	1·44	1–1·5	Trona (p. 453)	2·12	2·5–3
Mirabilite (p. 632)	1·48	1·5–2	Picromerite (p. 637)	2·1–2·2	
Whewellite (p. 641)		2·5	Castanite (p. 639)	2·12	3
Stercorite (p. 611)	1·615	2	Quenstedtite (p. 637)	2·12	2·5
Aluminite (p. 639)	1·66	1–2	Heintzite (p. 622)	2·13	4–5
Alunogen (p. 638)	1·6–1·8	1·5–2	Hydromagnesite (p. 452)	2·16	3·5
Borax (p. 622)	1·69–1·72	2–2·5	**Stilbite** (p. 551)	2·16–2·20	3·5–4
Boussingaultite (p. 637)	1·70		**Scolecite** (p. 557)	2·16–2·4	5–5·5
Apjohnite? (p. 637)	1·78	1·5	Brushite (p. 611)	2·21	2–2·5
Fibroferrite? (p. 639)	1·84	2–2·5	**Heulandite** (p. 548)	2·18–2·22	3·5–4
Inyoite (p. 622)	1·87	2·0	Darapskite (p. 619)	2·20	2–3
Melanterite (p. 636)	1·90	2	**Phillipsite** (p. 550)	2·2	4–4·5
Halotrichite? (p. 637)	1·9–2·0		Mesolite (p. 557)	2·2–2·4	5
Pickeringite (p. 637)			**Blödite** (p. 637)	2·25	2·5
Hydroboracite (p. 623)	1·9–2·0	2	Epistilbite (p. 549)	2·25	4–4·5
Gay-Lussite (p. 452)	1·94	2–3	Gismondite (p. 552)	2·26	4·5
Kröhnkite (p. 638)	1·98	2·5	**Laumontite** (p. 552)	2·25–2·36	3·5–4
Ärtinite (p. 453)	2·0	2·0	Metabrushite (p. 611)	2·29	2·5–3
Diadochite (p. 618)	2·035	3	Wellsite (p. 549)	2·28–2·37	4–4·5
Botryogen (p. 639)	2·04–2·14	2–2·5	Natrochalcite (p. 638)	2·3	4·5
Mordenite (p. 548)	2·08	3–4	Griffithite (p. 572)	2·31	1·0
Kainite (p. 631)	2·07–2·19	2·5–3	**Gypsum** (p. 633)	2·31–2·33	1·5–2
Quetenite? (p. 640)	2·08–2·14	3	Gibbsite (p. 435)	2·3–2·4	2·5–3·5
Copiapite (p. 638)	2·10	2·5	**Petalite** (p. 455)	2·39–2·46	6–6·5
Flokite (p. 552)	2·10	5	Colemanite (p. 621)	2·42	4–4·5

A. Luster Nonmetallic.

	Specific Gravity.	Hardness.
Hautefeuillite (p. 608)	2·435	2·5
Brewsterite (p. 549)	2·45	5
Harmotome (p. 550)	2·44–2·5	4·5
Pascoite (p. 609)	2·46	2·5
Ectropite (p. 582)	2·46	4
Hœrnesite (p. 608)	2·47	1
Wapplerite? (p. 611)	2·48	2–2·5
Serpentine (p. 573)	2·50–2·65	2·5–4
Calcioferrite (p. 615)	2·52–2·53	2·5
Eudidymite (p. 455)	2·55	6
Orthoclase (p. 457)	2·57	6
Kieserite (p. 633)	2·57	3–3·5
Vivianite (p. 608)	2·58–2·68	1·5–2
Syngenite (p. 636)	2·60	2·5
Kaolinite (p. 578)	2·6–2·63	2–2·5
Pharmacolite (p. 610)	2·64–2·73	2–2·5
Clinochlore (p. 569)	2·65–2·78	2–2·5
Pectolite (p. 483)	2·68–2·78	5
Augelite (p. 614)	2·7	4·5–5
Bavenite (p. 558)	2·7	5·5
Didymolite (p. 497)	2·71	4–5
Creedite (p. 402)	2·73	3–5
Glauberite (p. 625)	2·7–2·85	2·5–3
Vilateite (p. 610)	2·75	3–4
Polyhalite? (p. 637)	2·77	2·5–3
Muscovite (p. 560)	2·76–3	2–2·5
Lepidolite (p. 562)	2·8–2·9	2·5–4
Biotite (p. 563)	2·7–3·1	2·5–3
Phlogopite (p. 565)	2·78–2·85	2·5–3
Prochlorite (p. 571)	2·78–2·96	1–2
Hyalophane (p. 460)	2·805	6–6·5
Ganophyllite (p. 546)	2·84	4–4·5
Zinnwaldite (p. 563)	2·82–3·20	2·5–3
Cuspidine (p. 535)	2·86	5–6
Minguétite (p. 572)	2·86	
Liroconite (p. 615)	2·88	2–2·5
Wollastonite (p. 482)	2·8–2·9	4·5–5
Pyrophyllite (p. 579)	2·8–2·9	1–2
Prosopite (p. 402)	2·89	4·5
Epistolite (p. 592)	2·9	1–1·5
Corundophilite (p. 571)	2·90	2·5
Stilpnomelane (p. 572)	2·77–2·96	3·4
Tæniolite (p. 565)	2·9	2·5–3
Custerite (p. 497)	2·91	5·0
Isoclasite? (p. 611)	2·92	1·5
Roscoelite (p. 565)	2·92–2·94	
Carpholite (p. 540)	2·93	5–5·5
Datolite (p. 527)	2·9–3·0	5–5·5
Pachnolite (p. 402)	2·93–3	3
Thomsenolite (p. 402)	2·93–3	2–3
Cryolite (p. 399)	2·95–3	2·5
Mosandrite (p. 585)	2·93–3	4
Jezekite (p. 601)	2·94	4·5
Erythrite (p. 608)	2·95	1·5–2·5
Symplesite (p. 608)	2·96	2·5
Cabrerite (p. 609)	2·96	2
Beraunite (p. 615)	2·98	
Herderite (p. 601)	2·99–3·01	5
Margarite (p. 566)	2·99–3·08	3·5–4·5
Amphibole (p. 487)	2·9–3·4	5–6
Leucosphenite (p. 585)	3·0	6·5
Fremontite (p. 602)	3·04	5·5
Lazulite (p. 605)	3·06	5–6
Wagnerite (p. 600)	3·07	5–5·5
Szomolnokite (p. 633)	3·08	
Xanthophyllite (p. 567)	3·09	4·6
Seybertite (p. 566)	3–3·1	4–5
Lepidomelane (p. 565)	3·0–3·2	3
Bassetite (p. 617)	3·10	
Köttigite (p. 609)	3·1	2·5–3
Euclase (p. 529)	3·10	7·5
Glaucophane (p. 492)	3·10–3·11	6–6·5
Ludlamite (p. 614)	3·12	3–4
Spencerite (p. 612)	3·12	2·7
Lacroixite (p. 601)	3·13	4·1
Herrengrundite (p. 638)	3·13	2·5
Churchite? (p. 609)	3·14	3–3·5
Chondrodite (p. 536)	3·1–3·2	6–6·5
Clinohumite (p. 536)	3·1–3·2	6–6·5
Prolectite (p. 538)		
Spodumene (p. 480)	3·13–3·2	6·5–7
Hureaulite (p. 611)	3·185	5
Johannite (p. 640)	3·199	2–2·5
Palaite (p. 607)	3·2	
Hibbenite (p. 612)	3·21	3·7
Pyroxene (p. 474)	3·3–3·6	5–6
Neptunite (p. 585)	3·23	5–6
Johnstrupite (p. 585)	3·29	
Epidote (p. 531)	3·25–3·5	6–7
Rosenbuschite (p. 483)	3·3	5–6
Trögerite (p. 617)	3·3	
Ottrelite? (p. 567)	3·3	6–7
Gilpinite (p. 640)	73·3	2
Clinohedrite (p. 540)	3·33	5·5
Jadeite (p. 479)	3·33–3·35	6·5–7
Celsian (p. 460)	3·37	6–6·5
Homilite (p. 529)	3·38	5
Dickinsonite (p. 607)	3·34	3·5–4
Piedmontite (p. 532)	3·40	6·5
Wöhlerite (p. 484)	3·41–3·44	5·5–6
Sapphirine (p. 544)	3·42–3·48	7·5
Riebeckite (p. 493)	3·43	
Fillowite (p. 607)	3·43	4·5
Triplite (p. 600)	3·44–3·8	4–5·5
Orpiment (p. 357)	3·4–3·5	1·5–2
Rinkite (p. 585)	3·46	5
Arfvedsonite (p. 494)	3·44–3·45	6
Synadelphite (p. 606)	3·45–3·50	4·5
Titanite (p. 583)	3·4–3·65	5–5·5
Acmite (p. 479)	3·5–3·55	6–6·5

A. Luster Nonmetallic.

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Veszelyite (p. 612)	3·53	3·5–4	Dihydrite (p. 605)	4–4·4	4·5–5
Låvenite (p. 484)	3·51–3·55	6	Sarkinite (p. 601)	4·18	4–5
Chloritoid? (p. 567)	3·52–3·57	6·5	Pyrostilpnite (p. 390)	4·2	2
Keilhauite (p. 585)	3·52–3·77	6·5	Thalénite (p. 529)	4·2	6·5
Graftonite (p. 594)	3·7	5	**Clinoclasite** (p. 604)	4·19–4·36	2·5–3
Dietzeite (p. 619)	3·70	3–4	Kermesite (p. 383)	4·5–4·6	1–1·5
Triploidite (p. 601)	3·7	4·5–5	Catoptrite (p. 618)	4·5	5·5
Realgar (p. 357)	3·6	1·5–2	Lautarite (p. 619)	4·59	
Barytocalcite (p. 449)	3·65	4	**Monazite** (p. 593)	4·9–5·3	5–5·5
Adelite, Tilasite (p. 601)	3·74	5	**Linarite** (p. 632)	5·3–5·45	2·5
Chalcomenite (p. 641)	3·76		Lorandite (p. 386)	5·53	2–2·5
Azurite (p. 451)	3·77–3·83	3·5–4	Baddeleyite (p. 428)	5·5;6·025	6·5
Leucophœnicite (p. 538)	3·8	5·5–6	Vauquelinite (p. 630)	5·8–6·1	2·5–3
Allactite (p. 606)	3·83–3·85	4·5	**Crocoite** (p. 630)	5·9–6·1	2·5–3
Allanite (p. 533)	3·5–4·2	5·5–6	Agricolite (p. 510)	6·0?	
Claudetite (p. 409)	3·85–4·15	2·5	**Tenorite** (p. 412)	5·8–6·25	3–4
Hodgkinsonite (p. 582)	3·91	4·5–5	**Leadhillite** (p. 631)	6·26–6·44	2·5
Malachite (p. 450)	3·9–4·03	3·5–4	**Lanarkite** (p. 632)	6·3–6·4	2–2·5
Durangite (p. 601)	3·94–4·07	5	Atelestite (p. 606)	6·4	3–4·5
Hancockite (p. 533)	4·0	6–7	Alamosite (p. 483)	6·5	4·5
Partschinite (p. 510)	4·0	6·5–7	Fiedlerite (p. 401)		
Gadolinite (p. 529)	4·0–4·5	6·5–7	**Hübnerite** (p. 642)	7·2–7·5	5–5·5
Barylite (p. 498)	4·03	7	Raspite (p. 643)		
Tagilite (p. 612)	4·08	3–4	Terlinguaite (p. 401)	8·7	2–3
Barthite (p. 612)	4·19	3			

B. Luster Metallic (and Submetallic).

Baumhauerite (p. 386)	3·3	3	Semseyite (p. 387)	5·95	2–3
Allanite (p. 533)	3·5–4·2	5·5–6	Polybasite (p. 392)	6·0–6·2	2–3
Arizonite (p. 418)	4·25	5·5	Pearceite (p. 393)	6·15	3
Crednerite (p. 424)	4·9–5·1	4·5	Freieslebenite (p. 387)	6·2–6·4	2–2·5
Smithite (p. 386)	4·9	1·5–2	Jordanite (p. 391)	6·39	3
Miargyrite (p. 386)	5·1–5·3	2–2·5	**Wolframite** (p. 641)	7·2–7·5	5–5·5
Plagionite (p. 387)	5·4	2·5	Sylvanite (p. 382)	7·9–8·3	1·5–2
Jamesonite (p. 386)	5·5–6·0	2·3	Calaverite (p. 383)	9	2·5
Rittingerite (p. 393)	5·63	2–2·5			

VI. CRYSTALLIZATION TRICLINIC.

A. Luster Nonmetallic.

	Specific Gravity.	Hardness.		Specific Gravity.	Hardness.
Sassolite (p. 435)	1·48	1	Inesite (p. 546)	3·03	6
Lansfordite (p. 453)	1·54	2·5	**Amblygonite** (p. 602)	3·01–3·09	6
Hannayite (p. 611)	1·89		Fairfieldite (p. 607)	3·10	3·5
Amarantite (p. 639)	2·11	2·5	Messelite (p. 607)		3·5
Meyerhofferite (p. 622)	2·12	2	Chalcosiderite (p. 616)	3·11	4·5
Chalcanthite (p. 636)	2·12–2·30	2·5	**Axinite** (p. 534)	3·27	6·5–7
Römerite (p. 638)	2·17	3–3·5	Hiortdahlite (p. 485)	3·27	5–5·6
Ussingite (p. 470)	2·5	6–7	Parahopeite (p. 607)	3·3	3·7
Microcline (p. 460)	2·54–2·57	6–6·5	Babingtonite (p. 485)	3·35–3·37	5·5–6
Anorthoclase (p. 461)	2·57–2·60	6	Celsian (p. 460)	3·37	6–6·5
Albite (p. 464)	2·62–2·65	6–6·5	**Rhodonite** (p. 484)	3·4–3·68	5·5–6·5
Oligoclase (p. 466)	2·65–2·67	6–6·5	Trimerite (p. 515)	3·47	6–7
Anemousite (p. 468)	2·68		Chloritoid? (p. 567)	3·52–3·57	6·5
Andesine (p. 466)	2·68–2·69	6–6·5	Roselite (p. 607)	3·5–3·6	3·5
Labradorite (p. 466)	2·70–2·72	6–6·5	**Cyanite** (p. 526)	3·56–3·67	5–7·25
Anorthite (p. 467)	2·74–2·76	6–6·5	Brandtite (p. 607)	3·67	5–5·5
Turquois (p. 613)	2·6–2·83	5–6	Pyroxmangite (p. 485)	3·8	5·5–6
Monetite (p. 606)	2·75	3·5	Ænigmatite (p. 494)	3·85	
Anapaite (p. 607)	2·8	3·5	Margarosanite (p. 498)	3·99	2·5–3
Stewartite (p. 607)	2·94		Tarbuttite (p. 604)	4·1	3·7
Schizolite (p. 483)	3·0–31	5–5·5	Walpurgite? (p. 617)	5·76	3·5

TABLE III. CRYSTALLINE HABIT.

I. ISOMETRIC SYSTEM.

In the following lists some species are enumerated whose crystalline habit is often so marked as to be a distinctive character.

Cubes. — METALLIC LUSTER: Galena; Pyrite.

NONMETALLIC LUSTER: Fluorite; Cuprite (at times elongated into capillary forms), Cerargyrite; Halite; Sylvite; Boracite; Pharmacosiderite. Also Percylite; Perovskite.

Cube-like forms occur with the following: Apophyllite (tetragonal); Cryolite (monoclinic). Also with the *rhombohedral* species: Chabazite: Alunite; Calcite; rarely Quartz and Hematite.

Octahedrons. — METALLIC AND SUBMETALLIC LUSTER: Magnetite; Franklinite; Chromite; Uraninite. Also sometimes, Galena; Pyrite; Linnæite; Dysanalyte.

NONMETALLIC LUSTER: Spinel (incl. Hercynite and Gahnite); Cuprite; Diamond; Pyrochlore and Microlite; Ralstonite; Periclase; Alum.

Forms somewhat resembling regular octahedrons occur with some tetragonal species, as Braunite; Hausmannite; Chalcopyrite; Zircon, etc.; also with some *rhombohedral* species, as Dolomite.

Dodecahedrons. — METALLIC LUSTER: Magnetite; Amalgam.

NONMETALLIC LUSTER: Garnet; Cuprite; Sodalite.

Tetrahexahedrons. — Native opper; Fluorite.

Trapezohedrons. — NONMETALLIC LUSTER: Garnet; Leucite; Analcite.

Pyritohedrons. — METALLIC LUSTER: Pyrite; Cobaltite. Also Gersdorffite; Hauerite (submetallic).

Tetrahedrons. — METALLIC LUSTER: Tetrahedrite.

NONMETALLIC LUSTER: Sphalerite; Boracite; Helvite; Eulytite; Diamond; Zunyite.

The tetragonal sphenoids of Chalcopyrite sometimes closely resemble tetrahedrons.

II. TETRAGONAL SYSTEM.

Square Pyramids. — SUBMETALLIC LUSTER: Braunite; Hausmannite.

NONMETALLIC LUSTER: Zircon; Wulfenite; Vesuvianite; Octahedrite; Xenotime.

Square Prisms. — NONMETALLIC LUSTER: Zircon; Vesuvianite; Scapolites; Apophyllite; Phosgenite.

Square tabular crystals occur with Apophyllite; Wulfenite; Torbernite.

Prisms nearly square are noted with a number of *orthorhombic* species, e.g., Topaz; Andalusite; Danburite: also with the monoclinic Pyroxene ($100 \wedge 010 = 90°$, $110 \wedge 1\bar{1}0 = 87°$)

III. HEXAGONAL SYSTEM.

Hexagonal Prisms. — NONMETALLIC LUSTER: Beryl; Apatite; Pyromorphite; Vanadinite; Mimetite (usually indistinct rounded forms). Also Nephelite; Milarite: Tysonite, and others.

Hexagonal prisms are also common with the *rhombohedral* species: Quartz; Calcite; Tourmaline; Willemite; Phenacite; Dioptase, etc. Again, with the Micas, etc. Numerous rare species could be included here.

Many *orthorhombic* (or *monoclinic*) species having a prismatic angle of about 60° (and 120°) simulate this form both in simple crystals and still more as the result of twinning. Thus, Aragonite; Strontianite; Leadhillite; Iolite. It is also to be noted that the *isometric* dodecahedron, e.g., of Garnet, has often the form of a hexagonal pyramid with trihedral terminations (cf. Fig. 470, p. 175).

Tabular hexagonal prisms are noted with various species. Thus, METALLIC LUSTER: Graphite; Molybdenite; Hematite; Ilmenite; Pyrrhotite. NONMETALLIC LUSTER: Tridymite.

Hexagonal Pyramids. — Apatite: Corundum (rhombohedral); Quartz (rhombohedral-trapezohedral): Hanksite.

This form is often simulated by various *orthorhombic* species, in part as the result of twinning. For example, METALLIC LUSTER: Chalcocite; Stephanite; Polybasite; Jordanite; etc. Also Brookite.

NONMETALLIC LUSTER: Witherite; Bromlite; Cerussite; Iolite.

Trigonal Prisms. — Tourmaline.

Rhombohedrons. — Angle 75° (and 105°): Calcite; Dolomite; Siderite; Rhodochrosite. Angle not far from 90°: Chabazite; Alunite; Calcite; also Quartz; Hematite.

Scalenohedrons. — Calcite and allied Carbonates; Proustite.

IV. ORTHORHOMBIC, MONOCLINIC AND TRICLINIC SYSTEMS.

Prismatic Crystals. — METALLIC LUSTER: Stibnite; Arsenopyrite; Bournonite; Manganite; Göthite, etc.

NONMETALLIC LUSTER: (*orthorhombic*) Topaz; Staurolite; Andalusite; Barite; Celestite; Danburite. Also (*monoclinic*) Pyroxene; Amphibole; Orthoclase, and many others. Epidote crystals are often prismatic in aspect (Fig. 894, p. 531).

Tabular Crystals. — Barite; Cerussite; Calamine; Diaspore; Wollastonite; Albite.

Acicular Crystals. — METALLIC LUSTER: Stibnite; Bismuthinite; Millerite; Jamesonite; Aikinite, and other species.

NONMETALLIC LUSTER: Pectolite; Natrolite; Scolecite; Thomsonite, and other Zeolites. Also Aragonite; Strontianite; less often Calcite. Also many other species.

Twin Crystals. — The habit of the twins occurring with many species is very characteristic. Reference is made to pp. 165 to 172 and the accompanying figures for a presentation of this subject.

TABLE IV. STRUCTURE OF MASSIVE MINERALS

Fibrous. — *Fibers separable:* Asbestus (amphibole); also the similar asbestiform variety of serpentine (chrysotile); Crocidolite (color blue).

Fibers not separable, chiefly straight: Anthophyllite; Calcite; Gypsum. Also Aragonite; Barite; Celestite; Anhydrite; Brucite; Enstatite; Wollastonite; Dufrenite; Vivianite. See also *Columnar* below.

Fibrous-Radiated. — Wavellite; Pectolite; Thomsonite; Natrolite; Stilbite, Scolecite; and other Zeolites; Göthite; Malachit .

Columnar. — METALLIC LUSTER: Stibnite; Hematite; Jamesonite; Zinkenite, etc.

NONMETALLIC LUSTER: Limonite; Göthite; Aragonite; Amphibole (tremolite, actinolite, etc.); Epidote; Zoisite; Tourmaline; Sillimanite; Natrolite and other Zeolites; Strontianite; Witherite; Topaz.

Cyanite has often a *bladed* tructure.

Fibrous and columnar varieties pass into one another.

Lamellar-Stellate. — Gypsum; Pyrophyllite; Talc.

Foliated. — METALLIC LUSTER: Graphite; Molybdenite; Tetradymite; Sternbergite; Nagyagite.

NONMETALLIC LUSTER: Talc; Orpiment; Gypsum; Pyrophyllite; Serpentine; Gypsum.

Micaceous. — The Micas, p. 559: also the Brittle Micas, p. 566, and the Chlorites, p. 568. Also Brucite; Orpiment; Talc; Torberite; Autunite.

Granular. — METALLIC LUSTER: Galena; Hematite; Magnetite. Many sulphides, sulpharsenites; etc., have varieties which are fine-granular to compact and impalpable.

NONMETALLIC LUSTER: Pyroxene (coccolite); Garnet; Calcite; Barite, etc.

Botryoidal, Mammillary, Reniform, etc. — METALLIC LUSTER: Hematite; Arsenic; Allemontite.

NONMETALLIC LUSTER: Malachite; Prehnite; Smithsonite; Calamine; Chalcedony; Hyalite; rarely Sphalerite, etc.

Stalactitic. — METALLIC LUSTER: Limonite; Psilomelane; Marcasite.

NONMETALLIC LUSTER: Calcite; Aragonite; Gibbsite; Chalcedony.

Granular Cleavable. — METALLIC LUSTER: Galena.

NONMETALLIC LUSTER: Calcite; Dolomite; Sphalerite; Fluorite.

Oölitic. — Calcite; Aragonite; Hematite.

Earthy. — NONMETALLIC LUSTER: Magnesite; piolite

TABLE V. PHYSICAL CHARACTERS.

I. CLEAVAGE.

Cubic. — METALLIC LUSTER: Galena.

NONMETALLIC LUSTER: Halite: Sylvite. The cleavage of Anhydrite (also of Cyrolite) simulates this. Cf. also Corundum, p. 413.

Octahedral. — Fluorite; Diamond. Magnetite (also Franklinite) has often distinct octahedral *parting.*

Dodecahedral. — Sphalerite. Also, imperfect, Sodalite; Hauynite.

Rhombohedral. — Calcite and other species of the same group (pp. 437–445) angles 75° and 105°.

Square Prismatic (90°). — Scapolite; Rutile; Xenotime.

Prismatic. — Barite (78°½, 101°½); Celestite; Amphibole (54° and 126°), etc.

Basal. — METALLIC LUSTER: Graphite; Molybdenite.

NONMETALLIC LUSTER: Apophyllite; Topaz; Talc; the Micas and Chlorites; Chalcophyllite, etc. Pyroxene often shows marked basal *parting*.

Pinacoidal. — METALLIC LUSTER: Stibnite.

NONMETALLIC LUSTER: Gypsum; Orpiment; Euclase; Diaspore; Sillimanite; Cyanite; Feldspars.

II. HARDNESS.

1. **Soft Minerals.** — The following minerals are conspicuously *Soft*, that is, H = 2 or less; they hence have a *greasy* feel. (See further the Tables, pp. 679 to 688.)

METALLIC LUSTER: Graphite; Molybdenite; Tetradymite; Sternbergite; Argentite; Nagyagite; some of the Native Metals (Lead, etc.).

NONMETALLIC LUSTER: Talc; Pyrophyllite; Brucite; Tyrolite; Orpiment; Cerargyrite; Cinnabar; Sulphur; Gypsum.

Also Calomel, Arsenolite, and many hydrous sulphates, phosphats, etc.

2. **Hard Minerals.** — Minerals whose hardness is equal to or greater than 7 (Quartz = 7). The following minerals are here included:

LUSTER NONMETALLIC

QUARTZ (p. 403)	7	Hambergite (p. 620)	7·5
Tridymite (p. 407)	7	ZIRCON (p. 520)	7·5
Barylite (p. 498)	7	ANDALUSITE (p. 524)	7·5
Dumortierite (p. 543)	7	BERYL (p. 495)	7·5–8
Danburite (p. 522)	7–7·25	Lawsonite (p. 540)	7·5–8
BORACITE (p. 620)	7	Phenacite (p. 514)	7·5–8
Zunyite (p. 505)	7	Gahnite (p. 420)	7·5–8
CYANITE (p. 526)	5–7·25	Hercynite (p. 420)	7·5–8
TOURMALINE (p. 540)	7–7·5	SPINEL (p. 419)	8
GARNET (p. 505)	6·5–7·5	TOPAZ (p. 523)	8
IOLITE (p. 497)	7–7·5	Rhodizite (p. 621)	8
STAUROLITE (p. 543)	7–7·5	CHRYSOBERYL (p. 423)	8·5
Schorlomite (p. 510)	7–7·5	CORUNDUM (p. 413)	9
Sapphirine (p. 544)	7·5	DIAMOND (p. 345)	10
Euclase (p. 529)	7·5		

The following minerals have hardness equal to 6 to 7, or 6·5 — 7.

LUSTER METALLIC: Iridosmine (p. 355); Iridium (p. 355); Sperrylite (p. 379).

LUSTER NONMETALLIC: Ardennite (p. 539); Axinite (p. 534); Bertrandite (p. 539); Cassiterite (p. 425); Chrysolite (p. 511); Diaspore (p. 431); Elpidite (p. 496); Epidote (p. 531); Forsterite (p. 513); Gadolinite (p. 529); Jadeite (p. 479); Partschinite (p. 510); Sillimanite (p. 526); Spodumene (p. 480); Trimerite (p. 515).

III. SPECIFIC GRAVITY.

Attention is called to the remarks in Art. **302** (p. 199), on the relation of specific gravity to chemical composition. Also to the statements in Art. **303** as to the *average* specific gravity among minerals of metallic and nonmetallic luster respectively. The species in each of the separate lists of Table II of minerals classified with reference to crystallization are arranged according to ascending *specific gravities*. Hence the lists give at a glance minerals distinguished by both low and high density.

IV. LUSTER. (See Art. **364**, p. 249)

Metallic. — Native metals; most Sulphides; some Oxides, those containing iron, manganese, lead, etc.

Submetallic. — Here belong chiefly certain iron and manganese compounds, as Ilmenite; Ilvaite; Columbite; Tantalite (and allied species); Wolframite; Braunite; Hausmannite. Also Brookite; Uraninite, etc.

Adamantine. — Here belong minerals of high refractive index: (*a*) Some *hard* minerals: Diamond; Corundum; Cassiterite; Zircon; Rutile. (*b*) Many species of *high density*, as compounds of lead, also of silver, copper, mercury. Thus, Cerussite, Anglesite, Phosgenite, etc.; Cerargyrite; Cuprite; some Cinnabar, etc. (*c*) Also certain varieties of Sphalerite, Titanite and Octahedrite.

Metallic-Adamantine. — Pyrargyrite; some varieties of the following: Cuprite, Cerussite, Octahedrite, Rutile, Brookite.

Resinous or Waxy. — Sphalerite; Sulphur; Elæolite; Serpentine; many Phosphates.

Vitreous. — Quartz and many Silicates, as Garnet, Beryl, etc.

Pearly. — The foliated species: Talc, Brucite, Pyrophyllite. Also (on cleavage surfaces) conspicuously the following: Apophyllite, Stilbite, Heulandite. Also, less prominent: Barite; Celestite; Diaspore; some Feldspar, and others.

Silky. — Some fibrous minerals, as Gypsum, Calcite; also Asbestus; Malachite.

V. COLOR.

The following lists may be of some use in the way of suggestion. It is to be noted, however, that especially in the case of metallic minerals a slight surface change may alter the effect of color. Further, among minerals of nonmetallic luster particularly, no sharp line can be drawn between colors slightly different, and many variations of shade occur in the case of a single species. For these reasons no lists, unless inconveniently extended, could make any claim to completeness.

(*a*) Metallic Luster.

Silver-white, Tin-white. — Native silver; Native Antimony, Arsenic and Tellurium; Amalgam; Arsenopyrite and Löllingite; several sulphides, arsenides, etc., of cobalt or nickel, as Cobaltite (reddish); some Tellurides; (Bismuth (reddish).) No sharp line can be drawn between these and the following group.

Steel-gray. — Platinum; Manganite; Chalcocite; Sylvanite; Bournonite.

Blue-gray. — Molybdenite; Galena.

Lead-gray. — Many sulphides, as Galena (bluish); Stibnite; many Sulpharsenites, etc., as Jamesonite, Dufrenoysite, etc.

Iron-black. — Graphite; Tetrahedrite; Polybasite; Stephanite; Enargite; Pyrolusite; Magnetite; Hematite; Franklinite.

Black (with submetallic luster). — Ilmenite; Limonite; Columbite; Tantalite, etc.; Wolframite; Ilvaite; Uraninite, etc. The following are usually brownish black: Braunite; Hausmannite.

Copper-red. — Native copper.

Bronze-red. — Bornite (quickly tarnished giving purplish tints); Niccolite.

Bronze-yellow. — Pyrrhotite; Pentlandite; Breithauptite.

Brass-yellow. — Chalcopyrite; Millerite (bronze). Pale brass-yellow: Pyrite; Marcasite (whiter than Pyrite).

Gold-yellow. — Native gold; chalcopyrite and pyrite sometimes are mistaken for gold.

Streak. — The following minerals of metallic luster are notable for the color of their *streak:*

Cochineal-red: Pyrargyrite.

Cherry-red: Miargyrite.

Dull Red: Hematite; Cuprite; some cinnabar.

Scarlet: Cinnabar (usually nonmetallic).

Dark Brown: Manganite; Franklinite; Chromite.

Yellow: Limonite.

Tarnish. — The following are conspicuous for their bright or variegated tarnish: Chalcopyrite; Bornite (purplish tints); Tetrahedrite; some Limonite.

(*b*) Nonmetallic Luster.

Colorless. — In Crystals: Quartz; Calcite; Aragonite; Gypsum; Cerussite; Anglesite; Albite; Barite; Adularia; Topaz; Apophyllite; Natrolite and other Zeolites; Celestite; Diaspore; Nephelite; Meionite; Calamine; Cryolite; Phenacite, etc.

Massive: Quartz; Calcite; Gypsum; Hyalite (botryoidal).

White. — Crystals: Amphibole (tremolite); Pyroxene (diopside, usually greenish).

Massive: Calcite; Milky Quartz; Feldspars, especially Albite; Barite; Cerussite, Scapolite; Talc; Meerschaum; Magnesite; Kaolinite; Amblygonite, etc.

Blue. — Blackish Blue: Azurite; Crocidolite.

Indigo-blue: Indicolite (Tourmaline); Vivianite.

Azure-blue: Lazulite; Azurite; Lapis Lazuli; Turquois.

Prussian-blue: Sapphire; Cyanite; Iolite; Azurite; Chalcanthite and many copper compounds.

SKY-BLUE, MOUNTAIN-BLUE: Beryl; Celestite.
VIOLET-BLUE: Amethyst; Fluorite.
GREENISH BLUE: Amazon-stone; Chrysocolla; Calamine; Smithsonite; some Turquois; Beryl.
Green. — BLACKISH GREEN: Epidote; Serpentine; Pyroxene; Amphibole.
EMERALD-GREEN: Beryl (Emerald); Malachite; Dioptase; Atacamite; and many other copper compounds; Spodumene (hiddenite); Pyroxene (rare); Gahnite; Jadeite and Jade.
BLUISH GREEN: Beryl; Apatite; Fluorite; Amazon-stone; Prehnite; Calamine; Smithsonite; Chrysocolla; Chlorite; some Turquois.
MOUNTAIN GREEN: Beryl (aquamarine); Euclase.
APPLE-GREEN: Talc; Garnet; Chrysoprase; Willemite; Garnierite; Pyrophyllite: some Muscovite; Jadeite and Jade, Pyrophyllite.
PISTACHIO-GREEN: Epidote.
GRASS-GREEN: Pyromorphite; Wavellite; Variscite; Chrysoberyl.
GRAYISH GREEN: Amphibole and Pyroxene, many common kinds; Jasper; Jade.
YELLOW-GREEN to OLIVE-GREEN: Beryl; Apatite; Chrysoberyl; Chrysolite (olive-green); Chlorite; Serpentine; Titanite Datolite; Olivenite; Vesuvianite.
Yellow. — SULPHUR-YELLOW: Sulphur; some Vesuvianite.
ORANGE-YELLOW: Orpiment; Wulfenite; Mimetite.
STRAW-YELLOW, also WINE-YELLOW, WAX-YELLOW: Topaz; Sulphur; Fluorite; Cancrinite; Wulfenite; Vanadinite; Willemite; Calcite; Barite; Chrysolite; Chondrodite; Titanite; Datolite, etc.
BROWNISH YELLOW: Much Sphalerite; Siderite; Göthite.
OCHER-YELLOW: Göthite: Yellow ocher (limonite).
Red. — RUBY-RED: Ruby (corundum); Ruby spinel; much Garnet; Proustite; Vanadinite; Sphalerite; Chondrodite.
COCHINEAL-RED: Cuprite; Cinnabar.
HYACINTH-RED. — Zircon; Crocoite.
ORANGE-RED. — Zincite; Realgar; Wulfenite.
CRIMSON-RED: Tourmaline (rubellite); Spinel, Fluorite.
SCARLET-RED: Cinnabar.
BRICK-RED: Some Hematite (red ocher).
ROSE-RED to PINK: Rose quartz; Rhodonite; Rhodochrosite; Erythrite; some Scapolite. Apophyllite and Zoisite; Eudialyte; Petalite; Margarite.
PEACH-BLOSSOM RED to LILAC: Lepidolite; Rubellite.
FLESH-RED: Some Orthoclase; Willemite (the variety troostite); some Chabazite; Stilbite and Heulandite; Apatite; rarely Calcite; Polyhalite.
BROWNISH RED: Jasper; Limonite; Garnet; Sphalerite; Siderite; Rutile.
Brown. — REDDISH BROWN: Some Garnet; some Sphalerite; S aurolite; Cassiterite; Rutile.
CLOVE-BROWN: Axinite; Zircon; Pyromorphite.
YELLOWISH BROWN: Siderite and related carbonates; Sphalerite; Jasper; Limonite; Göthite; Tourmaline; Vesuvianite; Chrondrodite; Staurolite.
BLACKISH BROWN: Titanite; some Siderite; Sphalerite.
SMOKY BROWN: Quartz.
Black: Tourmaline; black Garnet (melanite); some Mica (especially biotite); also some Amphibole, Pyroxene and Epidote (these are mostly greenish or brownish black); further, some Sphalerite and some kinds of Quartz (varying from smoky brown to black); also Allanite; Samarskite. Some black minerals with submetallic luster are mentioned on p. 692.

Streak. — The *streak* is to be noted in the case of some minerals with nonmetallic luster. By far the majority have, even when deeply colored in the mass (e.g. Tourmaline), a streak differing but little from white. The following may be mentioned:
ORANGE-YELLOW: Zincite, Crocoite.
COCHINEAL-RED: Pyrargyrite and Proustite.
SCARLET RED: Cinnabar.
BROWNISH RED: Cuprite; Hematite.
BROWN: Limonite.
The streak of the various copper, green and blue minerals, as Malachite, Azurite, etc., is about the same as the color of the mineral itself, though often a little paler.