

GLG 333

COMMON ROCK-FORMING MINERALS

As you know from your mineralogy course, over three thousand distinct mineral species have been identified and described. Fortunately, however, the number of important rock-forming minerals with which a petrologist needs to be concerned is a small fraction of this total. As you can see from this compilation, the vast majority of the rock-forming minerals are silicates.

Nesosilicates

Olivine	$(\text{Mg,Fe})_2\text{SiO}_4$	I, m
Garnet		
"Red" garnets	$(\text{Mg,Fe,Mn})_3\text{Al}_2\text{Si}_3\text{O}_{12}$	i, M
"Green" garnets	$\text{Ca}_3(\text{Cr,Al,Fe}^{3+})_2\text{Si}_3\text{O}_{12}$	m
Zircon	ZrSiO_4	i, s, m
Alumino-silicate	Al_2SiO_5	M
Andalusite		M
Sillimanite		M
Kyanite		
Staurolite	$\text{FeAl}_9\text{O}_6(\text{SiO}_4)_4(\text{O,OH})_2$	M
Titanite (Sphene)	CaTiSiO_5	i, m

Sorosilicates

Epidote	$\text{Ca}_2(\text{Al,Fe})\text{Al}_2\text{O}(\text{SiO}_4)(\text{Si}_2\text{O}_7)(\text{OH})$	m
Vesuvianite (Idocrase)	$\text{Ca}_{10}(\text{Mg,Fe})_2\text{Al}_4(\text{SiO}_4)_5(\text{Si}_2\text{O}_7)_2(\text{OH})_4$	m

Cyclosilicates

Beryl	$\text{Be}_3\text{Al}_2(\text{Si}_6\text{O}_{18})$	i
Tourmaline	$(\text{Na,Ca})(\text{Li,Mg,Al})(\text{Al,Fe,Mn})_6(\text{BO}_3)_3\text{Si}_6\text{O}_{18}(\text{OH})_4$	i, m

Inosilicates

Pyroxene		
Ortho-pyroxene (enstatite-hypersthene)	$(\text{Mg,Fe})_2\text{Si}_2\text{O}_6$	I, M
Calcic-pyroxene (diopside-hedenbergite)	$\text{Ca}(\text{Mg,Fe})\text{Si}_2\text{O}_6$	i, M
Augite	$(\text{Ca,Na})(\text{Mg,Fe,Al})\text{Si}_2\text{O}_6$	I
Sodic-pyroxene (jadite-aegirine)	$\text{Na}(\text{Al,Fe}^{3+})\text{Si}_2\text{O}_6$	i, m
Wollastonite	CaSiO_3	M
Amphibole		
Anthophyllite	$(\text{Mg,Fe})_7\text{Si}_8\text{O}_{22}(\text{OH})_2$	M
Calcic-amphibole (tremolite-actinolite)	$\text{Ca}_2(\text{Mg,Fe})_5\text{Si}_8\text{O}_{22}(\text{OH})_2$	M
Hornblende	$(\text{Ca,Na})_2(\text{Mg,Fe,Al})_5\text{Si}_8\text{O}_{22}(\text{OH})_2$	I, M
Sodic-amphibole (glaucophane-riebeckite)	$\text{Na}_2(\text{Mg,Fe,Fe}^{3+},\text{Al})_5\text{Si}_8\text{O}_{22}(\text{OH})_2$	i, M

Phyllosilicates

Mica		
Muscovite	$\text{KAl}_2(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$	I, s, M
Biotite	$\text{K}(\text{Mg,Fe})_3(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$	I, s, M
Chlorite	$(\text{Mg,Fe})_3(\text{Si,Al})_4\text{O}_{10}(\text{OH})_2$ $\cdot(\text{Mg,Fe})_3(\text{OH})_6$	i, s, M
Serpentine	$\text{Mg}_3\text{Si}_2\text{O}_5(\text{OH})_4$	i, M
Talc	$\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$	M
Clay		
Kaolinite	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$	S
Illite	$\text{KAl}_5\text{Si}_7\text{O}_{20}(\text{OH})_4$	S
Smectite (Montmorillonite)	$(\text{Na,Ca})(\text{Mg,Fe})_4(\text{Si,Al})_8\text{O}_{20}(\text{OH})_4$ $+n\text{H}_2\text{O}$	S
Glaucinite	complex -- "hydrated biotite"	s

Tectosilicates

Quartz	SiO_2	I, S, M
Potassium Feldspar	KAlSi_3O_8	
Microcline		I, s, M
Orthoclase		I, s, m
Sanidine		I, s
Plagioclase Feldspar	$(\text{Na,Ca})\text{Al}_{1-2}\text{Si}_{2-3}\text{O}_8$	I, s, M
(albite, oligoclase, andesine, labradorite, bytownite, anorthite)		
Feldspathoid		
Leucite	KAlSi_2O_6	i
Nepheline	$(\text{Na,K})\text{AlSiO}_4$	I
Sodalite	$\text{Na}_8(\text{AlSiO}_4)_6\text{Cl}_2$	i

Non-silicates

Graphite	C	m
Pyrite	FeS_2	i, m
Rutile	TiO_2	i, m
Corundum	Al_2O_3	i, m
Hematite	Fe_2O_3	i, s, m
Ilmenite	FeTiO_3	i
Magnetite	Fe_3O_4	i, s, m
Chromite	FeCr_2O_4	i
Halite	NaCl	S
Sylvite	KCl	s
Fluorite	CaF_2	i, s
Calcite	CaCO_3	i, S, M
Dolomite	$\text{CaMg}(\text{CO}_3)_2$	S, m
Gypsum, Anhydrite	$\text{CaSO}_4 (\pm 2\text{H}_2\text{O})$	S
Apatite	$\text{Ca}_5(\text{PO}_4)_3(\text{F,Cl,OH})$	i, m