

Olivine

Olivine is an important mineral in the mantle of the earth, where it occurs in harzburgite, websterite and garnet peridotite. It is also found in kimberlites, komatiites, komatiitic basalts, ophiolites, alkali olivine basalts and olivine tholeiites. It is an important mineral in chondritic meteorite also.

Olivine is a common green or brown rock forming minerals which consists of a solid-solution series between Forsterite (Fo) and Fayalite (Fa).

It is an orthorhombic orthosilicate with isolated SiO_4 tetrahedra linked by divalent Mg or Fe ions.

Olivine is very susceptible to hydrothermal alteration, weathering and effects of low grade metamorphism, with several secondary minerals being produced, particularly serpentine.

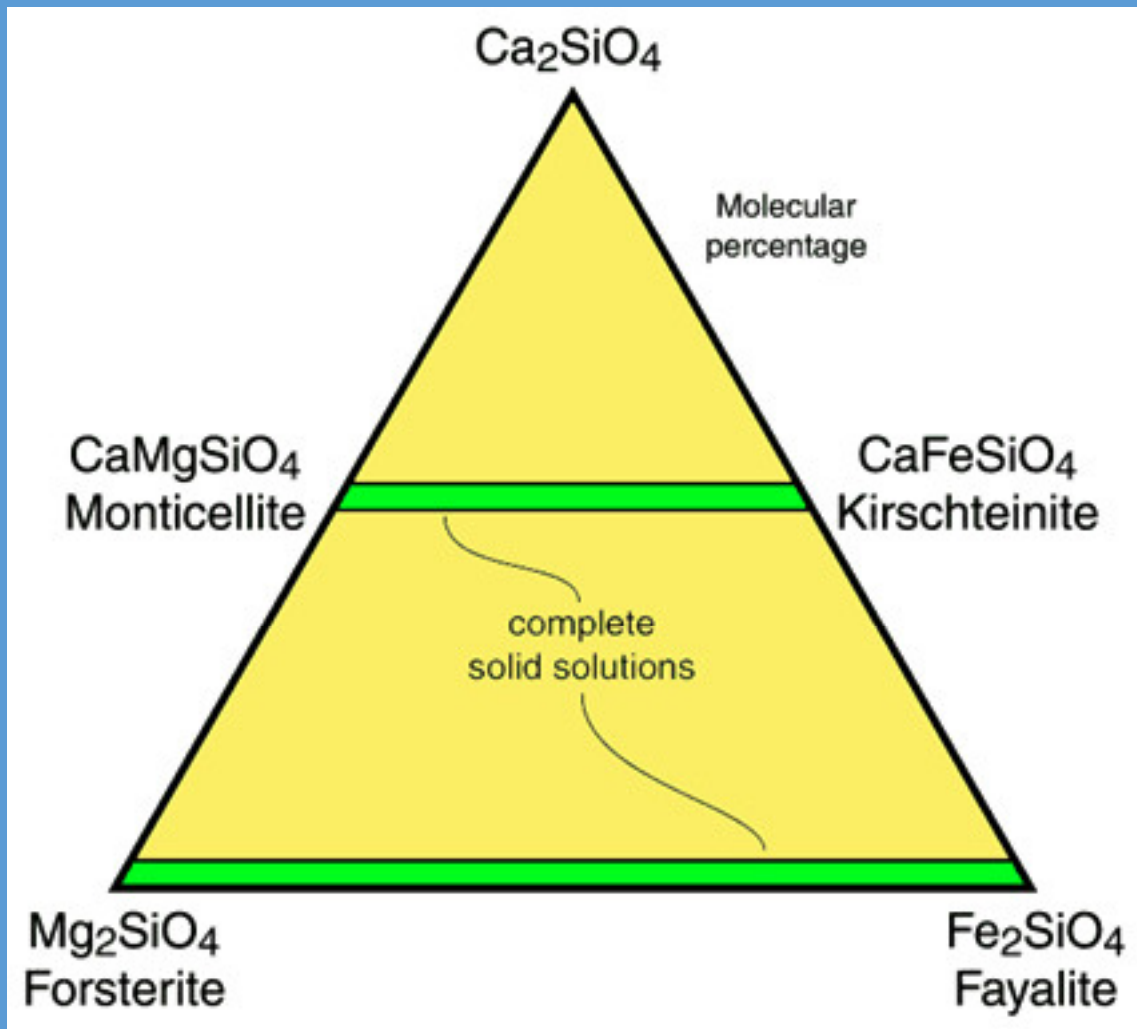
Physical Properties:

Crystal System:	Orthorhombic
Col:	Shades of green, pale green, olive green, white or yellow (forsterite), brown or black (fayalite)
Pt. Group:	2/m 2/m 2/m
Habit:	prismatic, granular
SG:	3.22(Fo) to 4.39(Fa)
L:	vitreous;
Streak:	white
F:	Conchoidal.
HD:	6-7

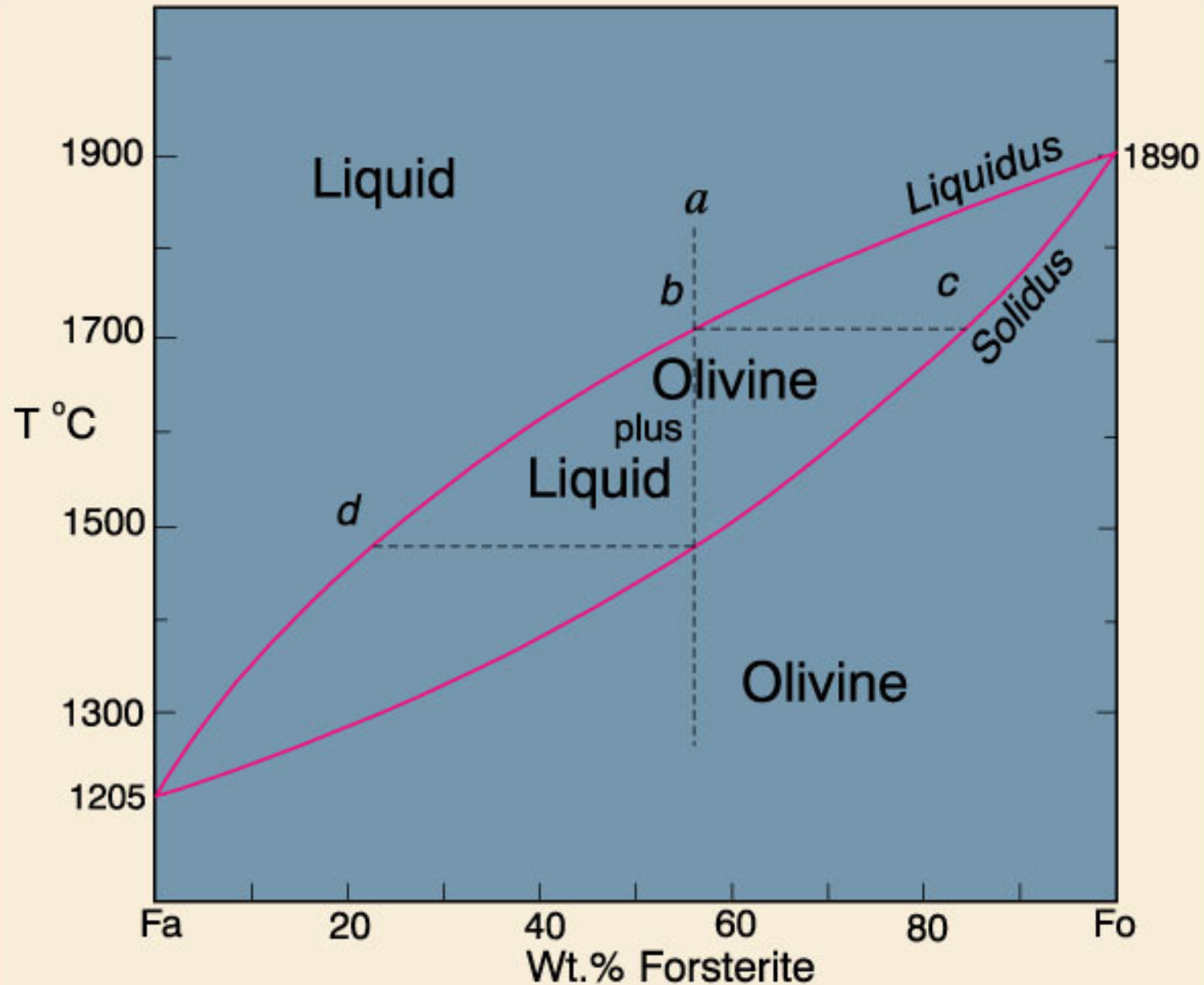
Olivine chemistry

The general formula for members of the olivine group is X_2SiO_4 , where X can equal Mg, Fe, Mn and Ca.

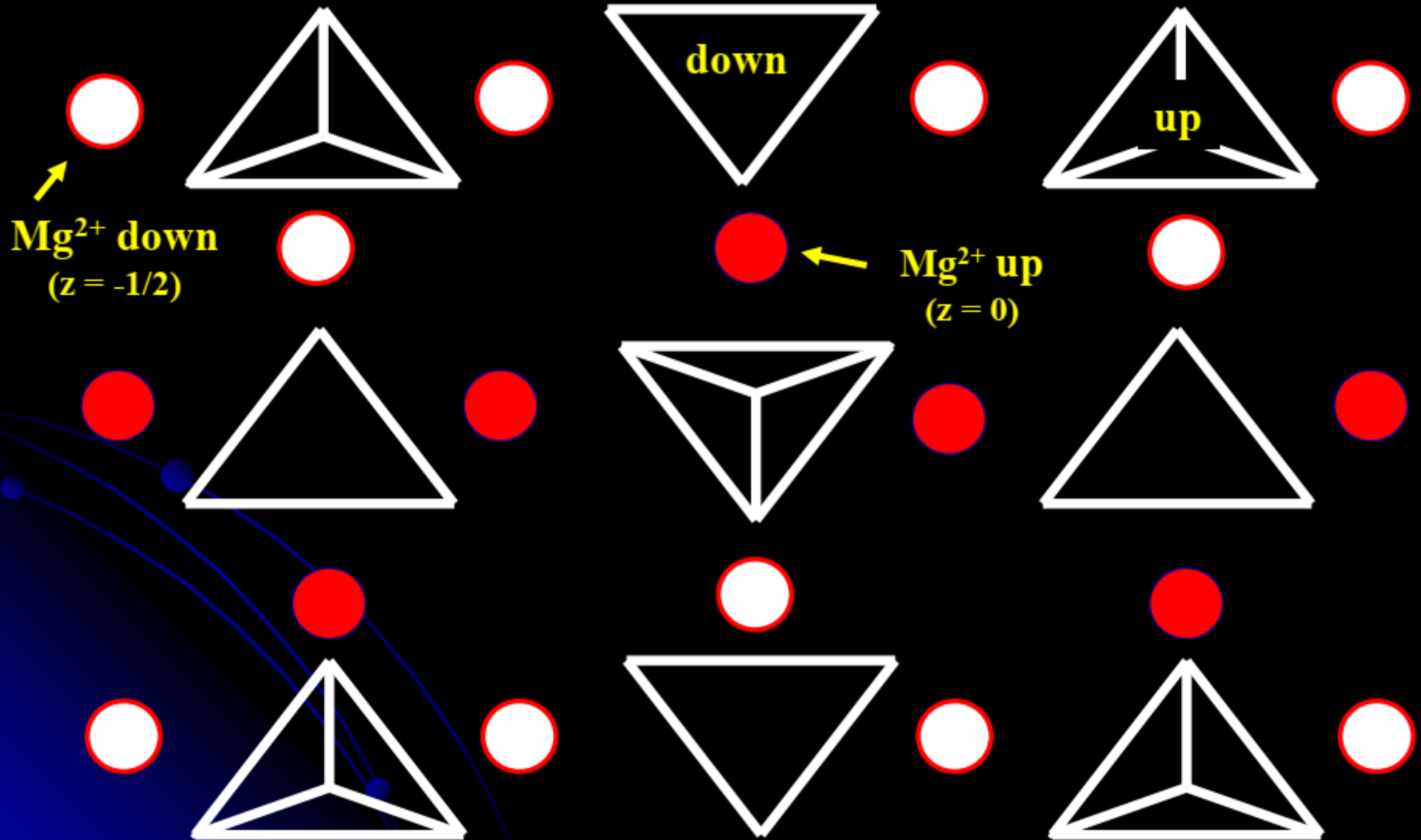
Olivine Minerals	
Mineral	Chemical Composition
Forsterite	Mg_2SiO_4
Fayalite	Fe_2SiO_4
Monticellite	$CaMgSiO_4$
Kirschsteinite	$CaFeSiO_4$
Tephroite	Mn_2SiO_4



Solid solution is a phase, where two or more elements are completely soluble in each other.



The olivine structure consists of Isolated $(\text{SiO}_4)^{4-}$ tetrahedra pointing alternately up and down along rows parallel to c axis.



Occurrence:

Mg-rich olivine is an essential mineral in most ultrabasic rocks : such as peridotite, picrites and dunites.

Mg-rich olivine occurs in basic igneous rocks such as gabbros, norites and basalts.

Pure forsterite is found in metamorphosed impure dolomite.

Peridot is gem variety of olivine, transparent and pale green, found in Egypt, Burma and Brazil.

