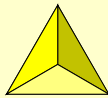


Biaxial Minerals Descriptions

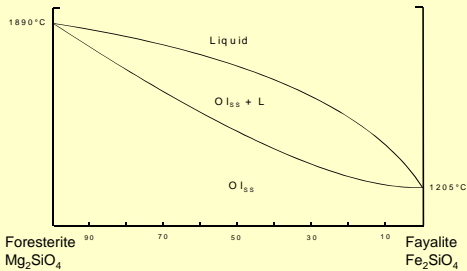
- **Olivine**
- Pyroxenes
 - Orthopyroxene
 - Clinopyroxene
- Amphibole
 - Hornblende
 - Actinolite
- Micas
 - Biotite, muscovite, chlorite
- Feldspars
 - Plagioclase
 - Microcline, orthoclase, sanidine

Olivine



- Orthosilicate – SiO_4
- General formula – $(\text{Mg,Fe})_2\text{SiO}_4$
- Represented by two end member components
 - Forsterite – Mg_2SiO_4
 - Fayalite – Fe_2SiO_4
- Natural Olivine is a mixture of the two, look at the olivine phase diagram

Olivine



Because the composition of Olivine varies, the optical and physical properties will also vary

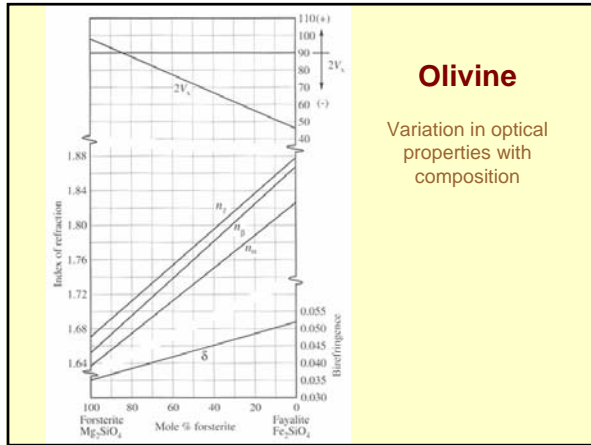
Olivine

Refractive Indices

	Fo	Fa
n_α	1.636	1.827
n_β	1.651	1.869
n_γ	1.669	1.872

Birefringence varies from 0.033 to 0.053

$2V_x$ angle varies from 46 to 98°, may be +ve ($2V_x > 90^\circ$) or -ve ($2V_x < 90^\circ$)



Olivine

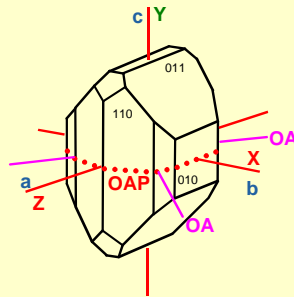
Variation in optical properties with composition

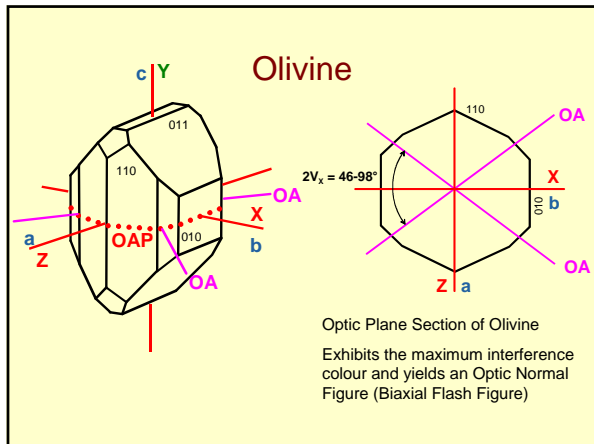
Olivine

Orthorhombic

Crystallographic axes are:

- Of unequal length
- Mutually perpendicular
- Coincide with indicatrix axes





Olivine

Colour and Pleochroism
Usually colourless in thin section and grain mount
Fe-rich samples are pleochroic
X = Z = pale yellow
Y = orange, yellow, reddish yellow

Olivine

Form, cleavage, fracture
Generally in plutonic rock olivine occurs as rounded anhedral grains
In volcanic rocks olivine is euhedral
Very poor cleavage, not visible in thin section, so unable to relate indicatrix axes to crystallographic axes
Will exhibit irregular fracture pattern

Olivine

Alteration

Alteration to serpentine along fractures

Occurrence

Olivine is found in basalts and gabbros (and their metamorphosed equivalents) as well as in ultramafic rocks and marbles

Olivine

Properties

1. High Relief
2. Moderate to strong interference colours
3. Irregular Fractures
4. No Cleavage
5. Alteration products

[Olivine page](#)

