

Biotite		Muscovite (cont)		Olivine (cont)		Plagioclase	
Color	Pale green, light brown, red brown	Extinction position	Parallel extinction	Alteration	Present	Color	Colorless
Pleochroism	Strongly pleochroic, light brown/-green -dark brown/green	Twinning	Hard to detect	Cross- nicol		Pleochroism	Non-pleochroic
Shape	Hexagonal plates	Diag. Prop.	Shape, cleavage, ex. Pos.	Anisotropic		Shape	Lath shape, Subhedral to anhedral
Relief	Moderate	Calcite		Int. Color	Bright colours of 2nd and 3rd order	Relief	Low
Cleavage	Distinct cleavage, 1set	Color	Colorless, sometimes cloudy	Extinction position	Parallel to cleavage & crystal outlines	Cleavage	Present
Inclusion	Colourless, apatite	Pleochroism	Non pleochroic	Twinning	Rare and poorly developed	Inclusion	Absent
Alteration	Present, becomes chlorite	Shape	Fine to coarse grained, subhedral to euhedral	Diag. Prop.	Col, cleav, ext. Pos & twinning	Alteration	Present
Cross- nicol		Relief	High to low, variable	Hornblende		Cross- nicol	
Anisotropic		Cleavage	3sets of perfect, rhombohedral	Color	Shades of yellow, green or brown	Anisotropic	
Interference colour	Strong, ranges upto 2nd order red colour	Inclusion	Present	Pleochroism	Strongly pleochroic, yellowish green to dark brown	Int. Color	1st order, light grey to yellowish grey
Extinction position	Parallel extinction	Alteration	Absent	Shape	Prismatic xtal, 6sided(basal section)	Extinction position	Oblique section
Twinning	Not observable	Cross nicol		Relief	Moderate to high	Twinning	Polysynthetic, Albite twin law
Diagnostic property	Col, pleo, Clea, int. Col	Anisotropic		Cleavage	Two distinct cleavage	Diag. Prop.	Shape, rel, cleav, twin
Muscovite		Int. Col	High 3,4 or 5th order	Microcline			
Color	Colorless	Ex. position	Symmetrical to cleavage	Colour	Colorless, sometimes cloudy		
Pleochroism	Non-pleochroic, may be pale green	Twinning	Prominent	Pleochroism	Non-pleochroic		
Shape	Tabular crystals, lamellar, flaky	Diag. Prop	Col, Clea, rel, twink, int.col	Shape	Lath shape, Subhedral to anhedral plates		
Relief	Moderate	Olivine		Relief	Low		
Cleavage	1 set, perfect	Color	Colorless/ faint green	Cleavage	Perfect		
Inclusion	Present	Pleochroism	Non-pleochroic	Under cross nicol			
Alteration	Present	Shape	Rounded/ anhedral	Anisotropic			
Under X- Nicol		Relief	High	Int. Color	1st order grey		
Anisotropic		Cleavage	Absent	Ext. Position	Oblique, < varies upto 15°		
Int. Color	Upto 2nd order, yellow or red	Inclusion	Absent	Twinning	Cross hatched, or grid twinning		

Quartz

Color	Colorless
Pleochroism	Non-pleochroic
Shape	Subhedral to euhedral, Trigonal
Relief	Very low
Cleavage	Absent
Inclusion	Present
Alteration	Absent
Cross-nicol	
Anisotropic	
Interference colour	1st order, white and grey
Extinction position	Undulose extinction
Twinning	Not visible
Diag. Prop.	Relief, cleavage, ex.pos., int.col.....it shows all -ve optical character

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