

Protocol 1 – setting up the transmitted-light polarised light microscope

1. Set up the microscope for transmitted-light brightfield Köhler illumination.
2. Insert a polariser oriented E-W into the light path.
(this polarizer may either be captive and pre-set (or rotatable) in a swing-in holder, or else a loose filter, to be introduced manually into the light path)

Note: The minerals biotite and tourmaline are strongly dichroic. They can be used to check the E-W alignment of the polarising filter with respect to the eyepiece cross-hairs: Biotite is darkest when aligned parallel to the direction of the lower polar (see Figure 14-5, section 14.6, below).

3. Insert an analyser N-S into the light path.
4. Either the polariser and/or analyser should be rotatable. Ensure that they are crossed to obtain maximum extinction¹. This adjustment can only properly be done whilst using the microscope: it is not sufficient to set the polariser and analyser externally.
5. Remove an eyepiece and check that the two polars are fully crossed, and extinction gives a maximally dark field when looking at the back focal plane of the objective.
6. Either use a centring telescope or (if fitted) swing in the Bertrand lens into the optical axis. An extinction ('polarisation') cross, is seen at extinction when no object is present.

This cross, as seen in the back focal plane of the objective, is shown below. The shape is due to depolarising effects of lenses in the condenser and objective. The 'arms' of the cross, should be oriented E-W and N-S; in other words, the cross should be 'upright'. If not the polariser and analyser may need to be adjusted slightly². Close the condenser illuminating aperture iris slightly to improve extinction. Beware that, as when adjusting the microscope for Köhler illumination, closing the condenser aperture diaphragm too much will adversely reduce the resolving power of the microscope.

7. Locate the slot at 45° for inserting a compensation plate.

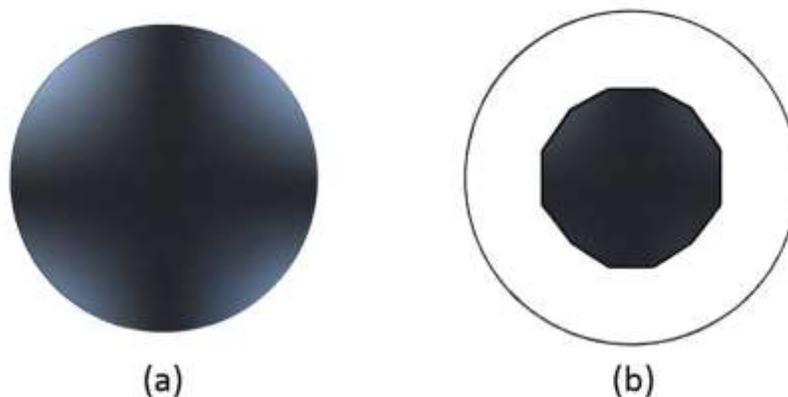


Figure 14-2 The extinction cross

¹ Crossed polars does not automatically guarantee the polars are set E-W and N-S. Generally the polariser and analyser have click-stop detents to ensure true alignment East-West and North-South.

² Since the polarizing microscope is primarily an analytical instrument, perfect alignment with respect to an azimuth at 0° is necessary for determining angles or if birefringence measurements are made with compensators. Rectified optics (see Chapter 13, section 13.6.1 on page xxx) if used will virtually eliminate the extinction cross.