

Glossary

Backscattered Electron – An electron from the microscope beam that has collided with one or more atoms in the surface of the sample – like a pinball bouncing around a pinball machine – and has eventually been bounced back out of the specimen. The backscattered electrons still have a lot of energy, i.e. are travelling at very high speed.

Secondary Electron – An electron that has been “shaken loose” by a high-energy electron passing close by.

SE1 – A secondary electron released from the specimen as an electron from the beam enters the specimen.

SE2 – A secondary electron released from the specimen as a backscattered electron exits from the specimen.

SE3 – A secondary electron released from part of the microscope chamber, (or the converter plate), when a backscattered electron hits it.

Photon Radiation – The visible light and infra-red light emitted by the hot specimen. The steel specimen was heated to 850°C, which is approaching “yellow hot”.

Orientation Contrast – Producing an image in which different parts of the specimen appear in different shades of grey, depending on the orientation (angle) between the crystal and the incoming electron beam. This effect is generated by channelling.

Channelling – The crystals of the specimen are composed of regularly stacked atoms. If the electrons hit the crystal “end on” to the columns of atoms, some electrons will go straight down the gaps between the columns. This is channelling. When this happens a proportion of the electrons will be deeper inside the specimen than usual by the time they have their first collision with one of the atoms in the specimen. Because they are deeper inside, fewer of them will escape as backscatter electrons and this crystal will appear darker than a crystal at a random orientation to the beam.