

Sample: S413; TSC33711

Hand Specimen:

A grey rock which is mainly very fine-grained but, when a wet, freshly cut surface is closely examined it can be seen that there is a band or zone of very fine-grained rock in contact with a band or zone which has patchy markings and which may be a fragmental rock.

Staining with cobaltinitrite shows a moderate amount of potash feldspar in both of these zones.

On one joint surface there is a film of a green mineral which may be a secondary copper mineral but this could not be confirmed.

Thin Section:

The composition varies in the different zones and much of it is too fine-grained for an accurate quantitative estimate of the minerals present.

The finer-grained zone contains up to 30% of chlorite intergrown with potash feldspar and almost certainly quartz and much of this material is microcrystalline to almost cryptocrystalline. In this very fine-grained matrix there are a few scattered larger, probably detrital grains of quartz and potash feldspar up to 0.1 mm in size and there are a few very thin streaks or wisps which contain leucoxene and chlorite. One tiny zircon grain was found. In some areas of this fine-grained band there are scattered crystals of opaque iron oxide 0.05 to 0.1 mm in size with external shapes suggesting magnetite, but, as the rock shows no evidence of magnetism and some of these now have a reddish streak, they are probably oxidized magnetite. Most of these are dispersed through parts of the rock but some are concentrated along small fractures which cut an earlier very small quartz and feldspar vein. There is a higher concentration of these iron oxide crystals and also of small fractures in a zone adjacent to the contact with the coarser-grained band.

The coarser-grained rock contains at least 10% of quartz grains or small quartz phenocrysts, most of which are less than 0.5 mm in size but there is one larger quartz fragment 1 mm long. This zone also contains numerous extensively altered feldspar grains or fragments of similar size to the quartz grains and staining of the hand specimen shows that most, if not all, of these are of potash feldspar. These are so altered that many of them are now barely visible in the thin section. The matrix is very fine-grained and is probably similar to much of the rock in the finer-grained band in that it is probably composed mainly of chlorite, potash feldspar and quartz. There are a few patchy variations in composition and there are some patches of sericite suggesting that there may have been other fragments of similar size to the quartz and potash feldspar but these now merge with the fine-grained matrix and cannot be readily distinguished. One elongate zircon crystal was found in this zone and there are scattered crystals of iron oxide which are very similar to those found in the finer-grained zone. Some of these are concentrated along fractures and clearly this iron oxide, which was probably once magnetite, has crystallized after the sediment was compacted.

Conclusion:

Indurated tuff in which there is a very fine-grained band in contact with a coarser-grained band. Both zones contain at least 5% of iron oxide crystals very probably oxidized magnetite and some of these are concentrated along small fractures.