161-976B-73X-1 (Piece 5)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	5	50	Equant, undulose.
Plagioclase	20	200–800	Polycrystalline aggregates, untwinned, 2V -ve, 85°.
K-feldspar	5	100	Interstitial, untwinned. 2V -ve, 60°.
Biotite	25	100	
Sillimanite	25	1000	Fibrolite mats.
Andalusite	20	2000	Helicitic porphyroblasts.
Garnet	Trace	1000	
Calcite	Trace	100	Only in a vein or layer.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	100	Replaces andalusite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust in plagioclase.
Opaque Oxide	Trace	100	
Tourmaline	Trace		
Apatite	Trace		

TEXTURAL DESCRIPTION: The main fabric element is an early foliation (parallel to compositional layering) that is folded, and a weak axial-planar cleavage. Abundant plagioclase aggregates have central elongate cores densely crowded with graphite inclusions that define an internal fabric, surrounded by polycrystalline overgrowths with strong irregular zoning that have fewer inclusions. The central cores were early porphyroblasts that grew statically over the early foliation, and were elongate parallel to it. Some biotite may have been oriented parallel to the early foliation, but most is recrystallized parallel to the axial planes of the folds. Fibrolite mats partly replace the biotite, and tend to be oriented parallel to the early foliation on the limbs of the folds, or to axial planes of the folds in the hinge areas. Garnet is strongly corroded, with coronas of biotite and plagioclase. Trails of garnet follow the compositional layering. Andalusite forms helicitic porphyroblasts. There is some alteration (weathering?) of plagioclase to clay.

161-976B-74X-1 (Piece 4A, interval 22–25)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	35	50–800	Smaller grains in matrix are equant, larger grains in veins undulose with subgrains.
Plagioclase	40	50–600	Poorly twinned, strongly zoned. 2V -ve, 85°.
Biotite	25	100	Somewhat bleached.
Garnet	Trace	1500	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Widely distributed dust.
Opaque Oxide	Trace		
Zircon	Trace		

TEXTURAL DESCRIPTION: The main fabric element is a strong foliation, defined by oriented biotite. An earlier fabric defined by biotite has been transposed in an intrafolial fold affecting a quartz vein. Plagioclase aggregates have central elongate cores with graphite inclusions that define an internal fabric oblique to the main foliation. These have rims that have grown over the main foliation. Garnet has strongly resorbed boundaries, with selvages of biotite or plagioclase. It has inclusions of opaque oxide, quartz, plagioclase, and biotite. Some garnets, and the quartz inclusions within them, are elongate parallel to the main foliation; others are rotated with respect to it. There is some alteration (weathering?) of plagioclase to clay.

161-976B-74X-1 (Piece 4A, interval 30-32)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	35	50–800	Smaller grains in matrix are equant, larger grains undulose.
Plagioclase	40	50–600	Twinned, An 65. Granoblastic in quartz-rich layers, porphyroblastic in mica-rich layers, and full of inclusions.
Biotite	20	100	
Garnet	5	1500	

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Chlorite		200	)
Muscovite		200	)
Calcite		200	) Only in "green band" as alteration products.
Opaque Oxide		100	)
Apatite		100	)

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Opaque Oxide	Trace	10–100	
Zircon	Trace	30	
Apatite	Trace	30	

TEXTURAL DESCRIPTION: The main fabric elements are an early foliation (parallel to compositional layering) that is tightly folded, and a crenulation cleavage. Plagioclase forms granoblastic aggregates with quartz, or 0.5 mm porphyroblasts crowded with in inclusions. Some biotite is oriented parallel to the early foliation, but most is recrystallized parallel to the axial planes of the folds. Garnet is strongly corroded, with coronas of plagioclase, and inclusions of opaque oxide, plagioclase and biotite. Some grains are elongate (or deformed and recrystallized); these grains, and their inclusion trails, are parallel to the main foliation. Equant grains have rotated inclusion trails. A "green band" visible in hand specimen has chlorite-muscovite aggregates replacing plagioclase, calcite, and opaque oxide. There is also a calcite vein.

161-976B-74X-1 (Piece 4C)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	5	50–800	Smaller grains in matrix are equant, larger grains in veins undulose with subgrains.
Plagioclase	25	200–800	Polycrystalline aggregates, untwinned.
Biotite	25	100–200	
Sillimanite	25	1000	Fibrolite mats replacing biotite.
Andalusite	20	up to 4000	Helicitic porphyroblasts.
Garnet	Trace	1000	
Staurolite	Trace	500	

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Muscovite	Trace	200	Replaces andalusite.

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite	Trace	<5	Dust.
Opaque Oxide	Trace	50	
Tourmaline	Trace	50–200	Abundant in some layers.

TEXTURAL DESCRIPTION: The main fabric elements are an early foliation (parallel to compositional layering) that is tightly folded, and a locally developed crenulation cleavage. Abundant plagioclase aggregates have central elongate cores densely crowded with graphite inclusions that define an internal fabric, surrounded by polycrystalline overgrowths. The central cores were early porphyroblasts that grew statically over the early foliation, and were elongate parallel to it; these are now rotated by the crenulations. The overgrowths have fewer inclusions than the cores, and have grown helicitically over the D2 crenulations. One plagioclase has a core with graphitic inclusion trails defining a 100μm spaced crenulation cleavage: this internal fabric is rotated with respect to the external fabric. Biotite is parallel to the early foliation, but is recrystallized and partly reoriented parallel to the crenulation cleavage. Fibrolite mats partly replace the biotite, and tend to be oriented parallel to the early foliation, or to the crenulation cleavage where this is strong. Garnet has rotated trails of inclusions. Andalusite forms helicitic porphyroblasts over the crenulation cleavage. It has cores rich in inclusions, particularly of graphite, and clear rims. Staurolite is heavily corroded and is mainly preserved as inclusions in the andalusite. Graphitic inclusion trails in the staurolite suggest that it grew over the early schistosity.

161-976B-74X-1 (Piece 6A, interval 58–60)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	5	100	Smaller grains in matrix are equant, larger grains in veins undulose with subgrains.
Plagioclase	50	400–800	Polycrystalline aggregates, untwinned.
Biotite	25	200	
Sillimanite	10	1000	Fibrolite mats replacing biotite, locally also prismatic,
Andalusite	5	up to 4000	Helicitic porphyroblasts.
Garnet	3	1000	
Staurolite	2	200	

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Muscovite	Trace		Replaces andalusite.

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Opaque Oxide	Trace		
Zircon	Trace	30	
Apatite	Trace	50	
Rutile	Trace	50	Mainly as inclusions in plagioclase, andalusite, or rutile.
Spinel	Trace	20	Only as inclusions in garnet and andalusite.
Tourmaline	Trace	20	

TEXTURAL DESCRIPTION: There are three domains in the slide. The lower domain shows good laminar foliation that is tightly folded. The central domain is occupied by a coarse-grained quartz-plagioclase vein. The upper domain has a very weak foliation and a granular texture. LOWER DOMAIN. Alternating 0.5 mm bands of quartz and plagioclase + biotite are tightly folded. Biotite is axial planar to these folds. CENTRAL DOMAIN. Quartz grains up to 1 mm, plagioclase up to 8 mm. UPPER DOMAIN. The foliation is defined by oriented biotite and sillimanite, but overprinted by abundant plagioclase porphyroblasts. Garnet is rounded, corroded, and has weakly oriented inclusion trails of biotite, quartz, opaque oxides, and brown spinel. Staurolite has very corroded outlines, and is almost always preserved as inclusions in andalusite, together with green spinel and rutile. Andalusite is helicitic over the fabric and has abundant inclusions.

161-976B-74X-1 (Piece 6A, interval 62–64)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	30	50–1500	Smaller grains in matrix are equant, larger grains in veins undulose.
Plagioclase	50	100–500	Twinned: An 45.
Biotite	20	100	
Garnet	Trace	1000	Very corroded outlines.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite	Trace	<5	Trace in plagioclase.
Opaque Oxide	Trace	50	In skeletal aggregates up to 1 mm.
Zircon	Trace		
Apatite	Trace	100	
Tourmaline	Trace		

TEXTURAL DESCRIPTION: The main fabric element is a foliation defined by mm-scale quartz-rich laminae and oriented early biotite: this is tightly folded. Biotite is strongly reoriented and recrystallized parallel to the axial planes of the folds. Plagioclase has early inclusion-rich cores that are strongly rotated, and late inclusion-poor rims that postdate the folds.

161-976B-74X-1 (Piece 11A)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	15	100–1000	Granoblastic; larger grains in veins.
Plagioclase	40	200–1000	Twinned, An 50.
K-feldspar	5	110	Interstitial in quartz-rich layers.
Biotite	15	100	
Sillimanite	15	1000	Fibrolite mats replacing biotite.
Andalusite	10	up to 5000	Helicitic porphyroblasts.
Garnet	Trace	500	
Staurolite	Trace	50	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust in plagioclase.
Opaque Oxide	Trace	50	
Tourmaline	Trace	100	
Apatite	Trace	30	
Zircon	Trace	30	
Hercynite	Trace	20	Included in andalusite

TEXTURAL DESCRIPTION: The main fabric elements is an early foliation, defined by quartz laminae, that is involved in tight asymmetric almost intrafolial folds. Biotite is oriented parallel to this fabric, but is recrystallized and reoriented parallel to the axial planes in the hinge areas of the folds, and in places there is a poorly developed crenulation cleavage. Plagioclase is elongate, with graphite inclusions that define an internal fabric, and it is rotated with respect to the external fabric. It has rims that include the folded inclusion trails, and hence postdate the crenulation cleavage. Fibrolite mats partly replace the biotite, and tend to be oriented parallel to the crenulation cleavage where this is developed. Garnet has inclusion-free cores, and straight trails of inclusions in the rims. It is strongly corroded, with biotite-rich coronas. Andalusite forms helicitic porphyroblasts that define the crenulation cleavage, and is rich in inclusions.

161-976B-75R-1 (Piece 2B)
ROCK NAME: BRECCIA

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz			
Plagioclase			
Biotite			
Sillimanite			
Andalusite			
Staurolite			
Garnet			
Corundum			
Opaque Oxide			
Muscovite			
Clay			
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Zircon			

TEXTURAL DESCRIPTION: The rock consists of angular to subrounded clasts, some of them with embayments, in a clay-rich matrix. Clast types: 1) High-grade schist. There is one big clast (2 cm), that has been broken into three adjacent pieces that fit together, with matrix separating them. This consists of layers of vein quartz, quartz-biotite-sillimanite-plagioclase schist, calcite-biotite schist, and calcite-biotite-andalusite-staurolite-corundum schist. All have a large amount of clay as an alteration mineral, and some retrogressive muscovite. The staurolite is included in andalusite. Corundum is abundant in the last-named layer, quartz is absent. 2) Clay-rich rock that appears itself to be a random-fabric microbreccia, with abundant angular fragments of quartz, biotite, muscovite and carbonate in an isotropic clay matrix. 3) Crystal fragments including biotite, quartz, garnet, and carbonate. 4) Fossil debris, including echinoid spines and foraminifers. These seem unbroken, suggesting a sedimentary process for the last stage of assembly of this rock.

161-976B-75R-1 (Piece 12)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite		80–2.2 mm	Idioblastic grains, variable in size, with interstitial chlorite.
Quartz		10–2 mm	Large elongated grains, with serrated boundaries and common basal subjoints and subgrains. Domain 4.
Biotite		300	In Domain 1.
Garnet		Up to 17 mm	In Domain 1. Large unique crystal with biotite and opaque at rims.
Plagioclase		150–280	Present in Domain 3 as small grains between calcite crystals.
K-feldspar		500–1.6 mm	Surrounding garnet in Domain 1.
Sphene		400	Idiomorphic, partly pseudomorphed by opaque and calcite. Domain 1 and 3.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite		200	Included in garnet.
Muscovite		150–200	Decussate texture, around garnet, in Domain 1.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Apatite	Trace	<5	In Domain 3.
Opaque Oxide	Trace		Common at garnet rims and as small inclusions in Domain 1.
Graphite	Trace		In Domain 1.

TEXTURAL DESCRIPTION:
There are four domains in the thin-section. DOMAIN 1 consists of a large garnet porphyroblast corroded and replaced by K-feldspar. Relict brown biotite is preferentially located around garnet rims, and is partly transformed to opaque minerals. Quartz is also present as small idioblastic grains (10 μm). Opaque minerals are common around the garnet rims and as smaller inclusions inside the porphyroblast. Garnet is also transformed to muscovite. Sphene is an accessory minerals in this domain. DOMAIN 2 consists of a colorless groundmass of green clay minerals. Abundant sphene grains lie parallel to the foliation, and show incipient transformation to opaque oxides at rims. A relict and corroded garnet is also present. This domain is between domains 1 and 3. DOMAIN 3 is a calcite-rich domain, with biotite, sphene, chlorite, and apatite. Calcite grains are elongate and define a foliation parallel to the orientation of biotite and of the domain boundaries. DOMAIN 4 is a quartz vein inside the Domain 2. Contains large and elongate quartz grains.

161-976B-75R-2 (Piece 7)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	35	50–1500	Fine-grained granoblastic in schist, coarse in veins.
Plagioclase	40	200–400	An 44.
Biotite	15	200	
Sillimanite	10	Up to 1 mm	Prismatic to fibrolitic.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust in plagioclase.
Opaque Oxide	Trace		
Tourmaline	Trace	100	
Zircon	Trace		

TEXTURAL DESCRIPTION: There is an early foliation, S1, defined by quartz and biotite-rich laminae, and by oriented early biotite. Biotite is recrystallized and reoriented parallel to the axial planes of microfolds in the foliation, defining a fabric S2. Sillimanite forms mats parallel to S2. Plagioclase forms elongate porphyroblasts with graphitic trails defining a rotated internal foliation (S1). Some grains have slightly curved trails suggesting growth during the early stages of D2. In a number of places these porphyroblasts have been rotated around the hinges of crenulations, producing clusters of grains that superficially resemble post-crenulation porphyroblasts. These can be distinguished because they are composed of a number of individuals with different optical orientations and straight or slightly curved inclusion trails. Late clear plagioclase postdates D2.

161-976B-76R-1 (Piece 7A)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz		50–500	Granoblastic.
Plagioclase		100–300	Twinned.
Biotite		200–500	
Sillimanite		1000	Fibrolite mats replacing biotite, prismatic up to 400μm.
Andalusite		up to 3000	Helicitic porphyroblasts.
Garnet		up to 3000	Porphyroblastic.
Staurolite		200-500	Porphyroblastic.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust in plagioclase.
Opaque Oxide	Trace		
Tourmaline	Trace		
Apatite	Trace		

TEXTURAL DESCRIPTION: There are four domains in the thin-section. DOMAIN 1 consists of schist with a strong foliation defined by biotite, fibrolite mats, and prismatic sillimanite forming from biotite. Plagioclase has grown over this foliation. Heavily corroded garnet forms augen in the foliation with tails of plagioclase + biotite + sillimanite. On the boundary with Domain 2, there is a large garnet with moderately rotated straight inclusion trails of graphite + opaque oxide, and rims with trails parallel to the external fabric, suggesting two stages of growth separated by some deformation. There is also a large andalusite porphyroblasts, with inclusions trails parallel to the external fabric, but there is some warping of the fabric around the crystal. DOMAIN 2 is a quartz-rich layer with 0.5 mm quartz and biotite laminae, parallel to the main foliation, involved in a tight intrafolial fold. Biotite lies parallel to the lamination, but is recrystallized parallel to the axial plane in the hinge area. Garnet has grown over the fabric, and there is no evidence for rotation or subsequent growth. DOMAIN 3 includes a layer of very large garnets, with inclusion trails suggesting growth over the foliation, and a second stage of growth producing clear rims with rounded polycrystalline outlines. There is also a layer full of well-oriented biotite and elongate staurolite porphyroblasts: the latter have grown over the main foliation. Garnet clearly includes staurolite. Next to it the biotite fabric is crenulated and a garnet has grown over the crenulations helicitically: presumably second stage garnet. Abundant coarse, stubby prismatic sillimanite has grown over the main foliation in this area. DOMAIN 4 has weakly oriented biotite and abundant late plagioclase porphyroblasts.

Summary:				andalusite
	biotite	late plagioclase		sillimanite
			late garnet and garnet rims	
D2 folding, S2	biotite			
		early plagioclase	early garnet and garnet cores	staurolite
D1 - main foliation	biotite			

161-976B-76R-1 (Piece 9A)
ROCK NAME: CALC-SILICATE ROCK/HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz		Up to 1000	Only in veins.
Plagioclase		100–200	Twinned. An 67.
Biotite		100–200	
Garnet		up to 2000	Porphyroblastic.
Spinel		50	Aggregates of green hercynite.
Corundum		Up to 300	Very high relief; no cleavage, uniaxial -ve; first order birefringence; lamellar twinning.
Clino-amphibole		Up to 3000	Pale green. Full of plagioclase inclusions.
Diopside		Up to 1000	
Calcite		200–1000	In domain 1.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sheet-silicate			
Chlorite		200–400	
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sphene	Trace	50	
Ilmenite	Trace	50	
Apatite	Trace	30	

TEXTURAL DESCRIPTION: The rock shows a series of layers in a fold hinge. DOMAIN 1: Coarse-grained calcite with disseminated biotite, pink garnet, diopside, clino-amphibole, plagioclase, and opaque oxide. Biotite is weakly oriented parallel to axial plane of fold. DOMAIN 2: Structureless aggregate of plagioclase, diopside, magnetite, and sphene. Domains 1 and 2 are separated by a zone of coarse-grained diopside, garnet and magnetite. DOMAIN 3: consists largely of a brown alteration mineral formed from diopside and amphibole, together with diopside, amphibole, plagioclase, calcite, sphene, and ilmenite. DOMAIN 4: Mainly amphibole, plagioclase, diopside, chlorite (after diopside?).
Quartz veins around the boundary between domains 4 and 5. DOMAIN 5: Biotite, plagioclase, opaque oxide, and garnet. Good biotite fabric parallel to the layering. DOMAIN 6: Biotite, plagioclase, spinel, corundum. Spinel forms aggregates amongst biotite, corundum occurs separately as spongy porphyroblasts forming from biotite.

161-976B-76R-2 (Piece 8B)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Plagioclase	40	100–200	Twinned. An 65. Granoblastic.
Clino-amphibole	5	Up to 1000	Pale green, rather altered. Locally is growing epitaxially on diopside.
Diopside	30	100–2000	2V = 60°, +ve. Exsolution lamellae. Granoblastic.
Calcite	15	200–1000	
Ortho-amphibole?	10	2000	Colorless, straight extinction, length slow, first order birefringence. Forms radiating aggregates in calcite. Anthophyllite?
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sheet-silicate	trace		Green-brown, non-pleochroic, moderate birefringence. Looks like a mixed layer mineral. Forming from ortho-amphibole.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sphene			
Opaque Oxide			

TEXTURAL DESCRIPTION: The rock shows a series of layers in a fold hinge. DOMAIN 1: Mainly granoblastic plagioclase and diopside, with a layering defined by grain size variations and bands with hornblende, opaque oxide and sphene. DOMAIN 2: Irregular patches of coarse calcite and ortho-amphibole, together with coarse plagioclase and diopside.

161-976B-77R-2 (Piece 3A)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	<1	100	
Plagioclase	50	200–400	Untwinned.
Biotite	20	200	
Sillimanite	25	1500	Fibrolite mats replacing biotite, and prismatic needles also up to 1500 μm.
Andalusite	2	up to 4000	Helicitic porphyroblasts.
Corundum	2	up to 2000	Nearly equant porphyroblasts . Colorless, no cleavage, R.I. approx 1.78; uniaxial -ve; second order birefringence (section is thick); oblique lamellar twinning.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	200	Replaces andalusite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust.
Opaque Oxide	Trace	50	
Tourmaline	1–2	100	Abundant in some layers.

TEXTURAL DESCRIPTION: The main foliation is defined by layers rich in plagioclase and minor quartz, biotite, and elongate plagioclase porphyroblasts. This is tightly folded, and biotite is recrystallized and reoriented parallel to the axial plane. Plagioclase porphyroblasts have central elongate cores with graphite inclusions that define a rotated internal fabric, and post-kinematic rims, commonly polycrystalline, without inclusions. Fibrolite mats partly replace the biotite, and tend to be oriented parallel to the axial plane of the fold. Corundum appears to form augen that lie in the foliation, possibly reflecting D2 deformation, and is partly enclosed by andalusite, which forms post-tectonic helicitic porphyroblasts.

161-976B-77R-2 (Piece 3E)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	2	200–250	Present in pressure-shadows around plagioclase porphyroblasts, and in a quartz-rich band parallel to the main foliation. Rectangular, well oriented grains with serrated boundaries.
Biotite	20	200–700	Oriented aggregates defining the main foliation, sometimes randomly oriented.
Sillimanite	35	up to 800	Prismatic to fibrolite fibers define the main foliation with biotite.
Andalusite	7	10–12 mm	Sometimes with chiastolite twinning, grows over the main foliation.
Plagioclase	25	600–1.1 mm	Commonly zoned, with dusty cores and clean thin rims (up to 100 μm thick). Smaller grains are also seen in the matrix as twinned crystals.
Garnet	Trace	2.2 mm	Porphyroclast grain, with dusty tails full of graphite, following the main foliation.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	100–550	Growing at expenses of plagioclase, and around at in andalusite cores.
Chlorite (Chamosite)	Trace	100–150	In the biotite-sillimanite rich domains, randomly oriented small crystals.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Apatite	Trace	20	
Tourmaline	up to 10%	100	Commonly zoned, with a bluish core and dark-green rims.
Graphite	Trace		Dust in plagioclase and andalusite.
Opaque	2	< 400	As elongated crystals in the matrix parallel to the main foliation, and also included in biotite, andalusite, and plagioclase.
Corundum	< 1	200-500	Idiomorphic, pseudo-hexagonal grains, with graphite and opaque inclusions defining an internal foliation parallel to the main foliation.
Rutile	Trace	30	As small inclusions in corundum.

TEXTURAL DESCRIPTION: The rock has a main foliation (S2) defined by the orientation of biotite, sillimanite, opaque, apatite, and tourmaline. Rare twinned plagioclase crystals also lie parallel to this foliation in the quartz-rich domains of the rock. Large, randomly oriented andalusite has grown over this foliation, including oriented grains of opaque oxide, biotite, and graphite dust. There are also small muscovite aggregates inside and around these andalusite grains. Plagioclase forms large zoned crystals with an internal foliation in the core commonly oblique to the external S2 foliation. Rims of plagioclase sometimes include opaque crystals, tourmaline, and biotite of the matrix, all parallel to S2. These textural relationships indicate two stages of growth of plagioclase, one pre-S2 and other post-S2. Corundum has rare inclusions of rutile and graphite, commonly parallel to S2. Thin coronas of muscovite (less than 200 μm thick) are seen around some corundum grains.

161-976B-77R-2 (Piece 10)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	70	150–500	Variably sized grains, with serrated boundaries and common subgrains.
Biotite	25	200–300	Oriented grains defining the main foliation, preferentially concentrated in mica-rich domains.
Sillimanite	Trace	< 100 μm	Incipient fibrolite form small mats growing at expense of biotite.
Plagioclase	5	100	As twinned grains preferentially concentrated in quartz-rich domain.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Apatite	Trace	10	
Tourmaline	Trace	100	As elongate crystals in the matrix parallel to the main foliation, abundant in quartz-rich domains.
Opaque	Trace	150–280	

TEXTURAL DESCRIPTION: The rock has a main foliation (S1 ?) defined by alternating bands with quartz-rich (800 μm–1 mm thick) and biotite-rich (200–300 μm thick) compositions. In the quartz-domains of the rock, plagioclase, tourmaline.

161-976B-77R-3 (Piece 6)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	75	100–320	
Biotite	25	200–300	Oriented grains defining the main foliation.
Sillimanite	Trace	< 100 μm	Incipient fibrolite form small mats growing at expense of biotite.
Plagioclase	Trace	100	As twinned grains preferentially concentrated in quartz-rich domain.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Apatite	Trace	< 50	
Tourmaline	Trace	< 20	

TEXTURAL DESCRIPTION: The rock has an S1 foliation folded by a tight fold. S1 is defined by quartz-rich bands (with plagioclase, tourmaline, and apatite) alternating with biotite-rich bands. In the fold a new axial-plane cleavage is developed (S2), defined by the orientation of biotite.

161-976B-78R-2 (Piece 1A)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	70	100–200	
Biotite	20	200–300	
Sillimanite	3	500	Fibrolite in different positions, included in plagioclase, forming patches around biotite, and as isolated needles in the matrix.
Plagioclase	7	150–1 mm	Clean twinned crystals in the matrix with quartz (usually around 150 μm), and as large porphyroblast with dusty cores.
Garnet	Trace	200	

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Apatite	Trace	< 90	Needle-like crystals.
Tourmaline	Trace	80–160	Dark green rectangular crystals.
Graphite		variable–250	Dust in the matrix and included in plagioclase cores.
Opaque		300–1.6 mm	Irregular in shape, dark brown in color. Some grains have square sections.

TEXTURAL DESCRIPTION: The rock has an S1 foliation defined by a compositional banding with alternating quartz-rich and biotite-rich bands. This foliation is folded, and a new crenulation cleavage, axial plane of these folds, is formed by the orientation of biotite, sillimanite, apatite and tourmaline. The S2 foliation is penetrative everywhere in the thin-section, and in fold limbs it is an S1/S2 composite foliation. Small plagioclase grains (< 200 μm) with dusty cores containing graphite inclusions lie parallel to the S1 foliation. In folds limbs, large plagioclase grains (up to 1 mm long) have inclusions parallel to the S1/S2 composite foliation, and partly include sillimanite needles from the matrix. These textural positions indicate two stages of growth of the plagioclase, one post-S1 and pre-folding, and the other between syn- to post-S2, during the sillimanite growth.

161-976B-79R-1 (Piece 17)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	30	250–350	
Biotite	40	up to 300	Dark-brownish green to pale-brown crystals. Some of them have thin layers of white mica (?) parallel to the cleavage planes.
Sillimanite	15	50–600	In patches and irregular aggregates of fibrolite, around biotite and plagioclase. Small needles (50 μm) of fibrolite included in plagioclase.
Plagioclase	10	200–500	Twinned clean crystals (200 μm) and un-twinned crystals (up to 500 μm) with abundant inclusions of graphite. Some crystals have folded inclusions.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Chlorite	Trace	80–100	Product of the breakdown of biotite. Dust crystals with diffuse boundaries.

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Apatite	Trace	30–80	More abundant in quartz-rich domains of the rock.
Tourmaline	Trace	100	Large grains are zoned. Green in color.
Graphite	5		Dust in the matrix.
Opaque	Trace	50–100	

TEXTURAL DESCRIPTION: Main foliation in the thin-section (S2) is defined by biotite, sillimanite-fibrolite patches and needle-like grains, and oriented grains of quartz and plagioclase. Tourmaline and apatite when distinguishable are parallel to S2. Randomly oriented needles of sillimanite (sometimes forming radial aggregates) are also present inside quartz grains. Sillimanite in the matrix is clearly replacing the biotite, and is preferentially concentrated around plagioclase. Some plagioclase crystals have rotated inclusions of graphite, not continuous with the external S2 foliation (helicitic texture), suggesting also a syn-S2 growth of the plagioclase.

161-976B-80R-1 (Piece 3A)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	15	70–400	
Biotite	40	100–800	
Sillimanite	25	up to 1.3 mm	
Andalusite	Trace	up to 2.4 mm	Large, randomly oriented porphyroblasts, sometimes surrounded by large decussate biotite crystals.
Plagioclase	15	50–700	With large amounts of graphite (sometimes sillimanite) inclusions. Some of these crystals are twinned.
K-feldspar	3	up to 2 mm	Large spongy crystals, with rounded inclusions of quartz (80–130 μm).

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Tourmaline	Trace	50–80	
Graphite	2		Dust in the matrix and as inclusions.
Opaque	Trace	100	
Apatite	Trace	up to 120	Included in plagioclase and K-feldspar.
Rutile	Trace	160	Irregular grains transformed to opaque oxides.

TEXTURAL DESCRIPTION: Main foliation (S2) defined by biotite, quartz, and minor tourmaline. Lenticular aggregates of sillimanite-fibrolite are parallel to the foliation, grow over biotite. In the matrix fibrolite has grown mimetically from biotite. This textural relationships shown that sillimanite has grown during and a little after the formation of S2. K-feldspar has abundant inclusions parallel to the external foliation, and abundant inclusions of rounded quartz. K-feldspar grains are confined between S2 foliation planes. From this textural evidence, K-feldspar seems to have been stable during D2 and also to have grown after D2. Plagioclase has abundant graphite inclusions parallel to the external S2 foliation or slightly folded, indicating a syn- to post-D2 growth. Andalusite shows clear evidence of post-D2 growth, as it is randomly oriented over the S2 foliation, with opaque and biotite inclusions parallel to the external foliation. Biotite coronas around andalusite and large recrystallized biotite porphyroblasts indicate post-D2 growth of biotite, stable with andalusite and plagioclase.

161-976B-81R-1 (Piece 18A)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	35	300–500	
Biotite	30	200–350	
Sillimanite	3	up to 300	
Plagioclase	20	150–600	
Andalusite	6	up to 2 mm	
K-feldspar	2	up to 800	Interstitial, surrounding rounded quartz and oriented biotite grains.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Tourmaline	Trace	50–70	Idioblastic to subidioblastic zoned crystals, with a dark-blue core (probable schorl tourmaline type).
Graphite	4		Dust in the matrix and in inclusions.
Opaque	Trace		
Apatite	Trace	50	

TEXTURAL DESCRIPTION: Main foliation in the rock is defined by sillimanite mats, biotite, quartz, graphite, oriented plagioclase grains, and tourmaline. Poikiloblastic andalusite grains grow over this foliation (S2), including oriented opaque and biotite grains. Some andalusite crystals include sillimanite fibers parallel to the external foliation.

161-976B-81R-2 (Piece 3)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	10	140–700	
Biotite	50	100–500	In some of the large crystals there are cleavage-parallel layers of white mica (?).
Sillimanite	10	150–200	
Plagioclase	20	400–600	

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Tourmaline	Trace	50–130	
Graphite	up to 10	up to 150	
Opaque	Trace		
Apatite	Trace	30	
Zircon	Trace	< 10	

TEXTURAL DESCRIPTION: Thin-section with a penetrative crenulation deforming a foliation (S1) defined by several fabric elements: 1) alternating bands of quartz, and biotite compositions, 2) preferential orientation of biotite and tourmaline, 3) relict veins with large (up to 700 μm) quartz grains, and 4) dusty plagioclase porphyroblast (usually < 400 μm, and without clean rims) with graphite inclusions parallel to the external and crenulated foliation. In the fold hinges of the crenulation, there are large (up to 500 μm) biotite crystals growing with a decussate texture between S1 foliation planes (similar to the saddle-reef texture), and abundant sillimanite crystals parallel to the fold axial plane (S2). In the fold limbs, sillimanite, biotite and plagioclase with inclusions parallel to the external foliation, evidence a composite S1/S2 character of the foliation. In some places, plagioclase crystals are surrounded by the composite foliation bearing sillimanite in aggregates, and have inclusions oblique to the external fabric. These textural relationships evidence a sillimanite+biotite syn-D2 growth, and a post-S1 (probably also syn-S2) growth of plagioclase.

161-976B-81R-2 (Piece 6)
ROCK NAME: MARBLE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite	95	600–1 mm	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite (Chamosite)	2	100–150	Intergranular crystals, and sometimes pseudomorphing relict opaque minerals.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	3	100–400	
Opaque	Trace	70–300	

TEXTURAL DESCRIPTION: Granoblastic, medium-size marble, with intergranular chamosite crystals. Muscovite is oriented defining a foliation.

161-976B-82R-1 (Piece 6)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	5	50–200	
Plagioclase	35	200–400	
K-feldspar	5	Up to 1000	Poikiloblastic.
Biotite	25	300	
Sillimanite	25	1000–2000	Fibrolite mats replacing biotite.
Andalusite	Up to 5	2000–3000	Helicitic porphyroblasts with biotite-rich selvages. Pink cores.
K-Feldspar	Up to 5	Up to 1000	Poikiloblastic.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust.
Opaque Oxide	Trace	50	
Tourmaline	Trace	100	
Apatite	Trace	10	Included in andalusite.
Zircon	Trace	Up to 50	

TEXTURAL DESCRIPTION: The main foliation is a crenulation cleavage. Early biotite is parallel to the crenulated fabric; but is recrystallized and reoriented parallel to the crenulation cleavage. Plagioclase porphyroblasts have central elongate cores with graphite inclusions that define a rotated internal fabric, and post-kinematic rims with fewer inclusions. Fibrolite mats partly replace the biotite, and tend to be oriented parallel to the crenulation cleavage. Andalusite forms post-tectonic helicitic porphyroblasts.

161-976B-82R-1 (Piece 9)
ROCK NAME: GRANITE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	25	200–1000	Anhedral, slightly strained.
Plagioclase	40	Up to 1000	Subhedral-euhedral, zoned. 2V = 95°, -ve. Twinned. An 30.
K-feldspar	25	1000–4000	
Biotite	5	Up to 1000	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
White Mica	5	10	Sericitized grains.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Andalusite	Up to 1	500	Prismatic, pink.
Sillimanite	Up to 1	100	Fibrolite seams along grain boundaries.

TEXTURAL DESCRIPTION: Fairly typical granitic texture. Myrmekite along feldspar grain boundaries.

161-976B-82R-2 (Piece 8)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	25	100–200	Granoblastic.
Plagioclase	25	500	
K-feldspar	10	500	
Biotite	20	200	
Sillimanite	20	500	Fibrolite mats, altered.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	200	Replaces andalusite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust.
Opaque Oxide	Trace	50	
Tourmaline	Trace	50	
Zircon	Trace	Up to 50	

TEXTURAL DESCRIPTION: The main foliation is defined by (1) 1–5 mm compositional bands of biotite + sillimanite + plagioclase, and quartz + K-feldspar + plagioclase; (2) 0.5 mm quartz-rich laminae, and (3) oriented biotite and sillimanite. It is probably a crenulation cleavage, but the section appears to be cut parallel to the crenulation axes (biotite with basal planes parallel to the slide in the crenulation hinges), so textural analysis is difficult. Plagioclase porphyroblasts have central cores with a rotated internal fabric, and post-kinematic rims with fewer inclusions. Some plagioclase grains have grown over complete crenulation hinges, and then been rotated: these may be syn- to late kinematic with the crenulation cleavage. There are also some plagioclase grains with inclusions defining nearly isoclinal crenulation hinges that may be related to the earlier fabric. Weak late crenulations trend at a high angle to the main foliation.

161-976B-83R-1 (Piece 3)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	15	50–200	Granoblastic.
Plagioclase	30	500	Porphyroblastic.
K-feldspar	15	50–100	Granoblastic.
Biotite	20	200	
Sillimanite	15	300	Fibrolitic.
Andalusite	5	3000	Helicitic porphyroblasts.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	300	Replaces andalusite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust.
Tourmaline	Trace	100	

TEXTURAL DESCRIPTION: The main foliation is defined by (1) alternating 3 mm compositional bands of biotite + sillimanite + plagioclase, and quartz + K-feldspar; (2) 0.5 mm quartz-rich laminae, and (3) oriented biotite. The foliation is folded, and biotite is deformed and recrystallized parallel to the axial planes, defining a weak second cleavage. Fibrolite mats tend to lie parallel to the second cleavage. Plagioclase porphyroblasts have central cores with a rotated internal fabric, and post-kinematic rims with fewer inclusions. Andalusite postdates the second cleavage.

161-976B-83R-1 (Piece 11A)
ROCK NAME: MARBLE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	20	100	Granoblastic.
Plagioclase	25	50–100	Granoblastic.
K-feldspar	5	100	Interstitial among quartz.
Calcite	10	200–400	
Diopside	2	150	
Scapolite	2	500	Colorless, moderate relief, single good cleavage, straight extinction, fast // cleavage, 3rd order birefringence. Ca-scapolite (meionite).
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Clay	36		
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sphene	Trace	Up to 300	
Opaque Oxide	Trace		

TEXTURAL DESCRIPTION: Banded rock with layers of (1) calcite + minor diopside, (2) calcite + quartz + plagioclase + K-feldspar + sphene + clay, (3) calcite + sphene + clay, (4) quartz + K-feldspar + clay. Not clear what has broken down to clay: possibilities include biotite, plagioclase, K-feldspar, and cordierite.

161-976B-83R-2 (Piece 1)
ROCK NAME: MARBLE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	30	200	Granoblastic.
Plagioclase	30	100–400	Granoblastic.
Calcite	30	200–400	Granoblastic.
Diopside	5	50–100	Isolated partly altered grains.
Scapolite	5	4000	Porphyroblastic. Colorless, moderate relief, single good cleavage, straight extinction, fast // cleavage, 3rd order birefringence, uniaxial -ve. Ca-scapolite (meionite).
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite	Trace		
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Clino-amphibole	Trace	500	Partly altered.
Biotite	Trace		
Sphene	Trace	Up to 300	
Opaque Oxide	Trace	400	

TEXTURAL DESCRIPTION: Banded rock with layers of (1) calcite + dispersed plagioclase + green clino-amphibole + biotite + rare diopside + sphene + alteration products including chlorite, and (2) quartz + plagioclase + diopside + scapolite + sphene + alteration products.

161-976B-84R-1 (Piece 3)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	5	Up to 800	Mainly in veins.
Plagioclase	20	100–1000	Twinned and zoned.
Biotite	30	300	
Sillimanite	5	800	Fibrolite mats and prismatic.
Andalusite	40	Up to 8000	Poikiloblastic.
Staurolite	Trace	Up to 4000	Included in andalusite.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	100	Replaces andalusite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust in plagioclase.
Opaque Oxide	Trace	50	
Tourmaline	Trace	50	
Spinel	Trace	50	Included in andalusite.

TEXTURAL DESCRIPTION: The main foliation is a crenulation cleavage with oriented biotite, sillimanite, and elongate plagioclase porphyroblasts, but the section appears to be cut parallel to the crenulation axes (biotite with basal planes parallel to the slide in the crenulation hinges), so textural analysis is difficult. Plagioclase forms early 1 mm elongate porphyroblasts with dense graphite dust defining inclusion trails parallel to the external fabric, and late clear 100 μm zoned and twinned crystals.
There is a weak orientation of newly crystallized biotite at a high angle to the foliation, and the essentially post-kinematic andalusite porphyroblasts also appear to be preferentially elongate in the same direction.

161-976B-84R-1 (Piece 8B)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	trace		
Plagioclase	35	200	Twinned. An 42.
Biotite	35	200	
Sillimanite	10	400	Fibrolite mats.
Andalusite	20	1000–4000	Poikiloblastic.
Garnet	Trace	600	Idiomorphic. Includes sillimanite.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	200	Replaces andalusite.
Chlorite	Trace	200	
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace	<5	Dust.
Ilmenite	Trace	100	
Tourmaline	Trace	100	
Rutile	Trace		
Zircon	Trace	20	

TEXTURAL DESCRIPTION: The main foliation is a crenulation cleavage, which is locally well preserved, but generally strongly transposed. This fabric changes orientation through about 30° within the central part of the slide, apparently swinging into a parallelism with a shear zone. Plagioclase porphyroblasts have central cores with a rotated internal fabric, and rims and larger grains that have grown locally over crenulation hinges. Biotite and sillimanite are mainly oriented parallel to the crenulation cleavage, but locally both follow the older foliation around crenulation hinges. Most andalusite appears to be essentially post-kinematic with respect to the main fabric, but in the central shear zone the foliation wraps around andalusite crystals.

161-976B-93R-1 (Piece 8)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	25	200–500	
Plagioclase	40	100	Zoned, but un-twinned.
K-feldspar	15	100–1000	
Biotite	10	300–500	
Andalusite	5	100–500	Partly altered to muscovite.
Cordierite	5	Up to 5000	Partly altered to sericite and muscovite.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	200	
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sillimanite	Trace		Inclusions in cordierite.
Opaque Oxide	Trace	100	
Tourmaline	Trace	100	

TEXTURAL DESCRIPTION: A weak foliation is defined by compositional layering, oriented biotite, and elongate feldspar poikiloblasts. Muscovite is also parallel to the foliation: mimetic? Andalusite appear to be unstable, surrounded and invaded by plagioclase, and locally replaced by muscovite. Cordierite is also partly altered to sericite and coarser-grained muscovite.

161-976B-94R-1 (Piece 3)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	20	100–200	Granoblastic.
Plagioclase	30	200	Granoblastic. Zoned, twinned. An 45.
K-feldspar	20	100–1000	
Biotite	10		
Sillimanite	5	2000	Prismatic. Largely altered to muscovite.
Andalusite	10	100–500	
Cordierite	5	5000	Elongate porphyroblasts.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	1000	Retrogressive from cordierite, andalusite, and sillimanite.
Chlorite	Trace	100	Retrogressive from cordierite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Opaque Oxide	Trace	100	
Tourmaline	Trace	100	

TEXTURAL DESCRIPTION: A foliation defined by biotite and elongate ore minerals is tightly folded, and the main foliation is a weak crenulation cleavage defined by oriented biotite and sillimanite. Andalusite has grown helicitically over the folded trails of opaque oxide, and also the crenulation cleavage, including biotite and sillimanite. Andalusite appear to be unstable, and has broken down to an aggregate of 100 μm rounded blebs surrounded by plagioclase. These aggregates are somewhat deformed, as the individual blebs are no longer in optical continuity. Andalusite is also patchily replaced by muscovite. Cordierite has also grown over the crenulations, and includes sillimanite. Plagioclase and K-feldspar are granoblastic and have recrystallized after the crenulation event.

161-976B-95R-2 (Piece 1C)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	30	500–1.6 mm	
K-feldspar	10	up to 2.8–3 mm	
Plagioclase	30	1.2–1.4 mm	
Sillimanite	25	up to 3 mm	
Cordierite	3	1–4 mm	With gulf of corrosion, transformed in rims to sillimanite-fibrolite and pinnite.
Biotite	1	up to 400	Small (< 100 μm) green biotite in plagioclase domains, and rare green-brown biotite with sillimanite.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite	Trace		Alteration product of cordierite, plagioclase, and K-feldspar.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Opaque	1	200–1 mm	Square sections surrounded by sillimanite fibers, with pressure shadows. Appearance like magnetite.
Rutile	Trace	< 100	Included in biotite. Sometimes a symplectite of rutile-opaque minerals is included in a single biotite grain.
Tourmaline	Trace	< 150	Included in biotite and cordierite.

TEXTURAL DESCRIPTION: Main foliation in the rock is defined by large, elongate and deformed sillimanite-fibrolite aggregates (up to 3-5 mm), that surround square opaque crystals (magnetite ?) forming pressure-shadows. These sillimanite-rich domains define lenticular domains in which K-feldspar, plagioclase and quartz are the major constituents. Locally in these domains small (< 200 μm) green biotite occur, also parallel to the main foliation. Plagioclase, K-feldspar, and quartz show evidence of plastic deformation with abundant subgrains, and common triple points between quartz grains and plagioclase. These observations point to a plastic deformation at relatively high temperature. The attribution to one phase of deformation of the planar fabric of the rock, is done to S3 considering that it deforms sillimanite aggregates. In this thin-section S3 has a mylonitic character. Relict cordierite is present in some of the quartz-rich domains, partly transformed to sillimanite and pinnite, and with inclusions of biotite and tourmaline parallel to the external foliation. Small randomly oriented sillimanite needles are distributed everywhere in the thin-section. This textural observation indicates that sillimanite was stable during D3, and that the cordierite growth occurred between S2 (now preserved as inclusions in cordierite) and S3. The parallelism between inclusions and external foliation shows the S2/S3 composite character of the main foliation in this gneissic rock.

161-976B-97R-1 (Piece 2)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	20	up to 4 mm	
K-feldspar	20	1.2–4 mm	
Plagioclase	20	up to 2 mm	With simple and double twins.
Cordierite	10	3.6–2.8 mm	(Up to 2 cm). With gulf of corrosion, transformed in rims to sillimanite-fibrolite, and pinnite.
Biotite	24	500–800	Green biotite.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	5		Idiomorphic crystals grow mimetically at expenses of biotite and around cordierite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Opaque	1–2	200–800	In the matrix and as inclusions in cordierite.
Tourmaline	< 1	100–170	
Apatite	Trace	< 50	Needles in the matrix.

TEXTURAL DESCRIPTION: Felsic gneiss with foliation (S3 ?) defined by green biotite, tourmaline, and lenticular domains of K-feldspar, plagioclase, and quartz. Muscovite grows mimetically at expense of the biotite in the matrix, and is also parallel to S3. Plagioclase and K-feldspar porphyroblasts have subgrains and serrated borders, smaller grains occur in the matrix defining the foliation. Cordierite is largely transformed and corroded by muscovite, which forms large aggregates of randomly oriented crystals. K-feldspar commonly has abundant, surrounded, and randomly oriented inclusions of quartz and green-biotite.

161-976B-97R-2 (Piece 22)
ROCK NAME: GRANITE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	30	800	
Plagioclase	15	700	Subhedral. Twinned. Small inclusions of quartz.
K-feldspar	45	600–1600	Euhedral to subhedral.
Biotite	5	140	Dark brown to pale brownish yellow, with inclusions of rutile partly transformed to ilmenite.
Cordierite	5	1 mm	Altered to muscovite, which forms a corona around it, and then to chlorite.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
White Mica		400	Retrogressive after cordierite and biotite.
Chlorite			Retrogressive after cordierite and biotite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Tourmaline	Trace	520	Violet-blue to pale pink.
Ilmenite	Trace		
Rutile	Trace		
Apatite	Trace	250	Euhedral.

TEXTURAL DESCRIPTION: Equigranular medium-grained granite.

161-976B-98R-1 (Piece 5)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	45	100–1.8 mm	
Plagioclase	25	up to 1.8–3 mm	
K-feldspar	20	up to 2–4 mm	
Biotite	7	up to 800	
Sillimanite	2	up to 8 mm	
Cordierite	1	up to 2 mm	Corroded by muscovite and sericite aggregates, with large idiomorphic crystals.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
White Mica	Trace	200	Inclusions in plagioclase and K-feldspar. Transformation product from cordierite and mimetic from biotite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Tourmaline	1	520	Violet-blue.
Opaque	< 1	150–800	
Apatite	Trace	100	Idiomorphic.

TEXTURAL DESCRIPTION: Leucocratic banded gneiss with minor sillimanite-fibrolite, preferentially concentrated around quartz + K-feldspar domains. Main foliation (S3 probably) defined by green biotite, sillimanite, and orientated porphyroblasts of quartz and plagioclase. Fine-grained granular bands of K-feldspar, plagioclase, and quartz parallel to the main foliation. The grain size of the felsic minerals varies from one band to another. A calcite vein cuts the foliation across the thin section.

161-976B-98R-1 (Piece 14)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	15	150–2 mm	
Plagioclase	35	400-800	
K-feldspar	15	500–2 mm	
Biotite	25	300-800	
Sillimanite	Trace	150–300	
Cordierite	8	up to 4 mm	
Garnet	Trace	400	Idiomorphic garnet growing at expenses of green biotite, and spatially associated with opaque oxide.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
White Mica	Trace	600–1 mm	Growing at expenses of green biotite, and cordierite.
Sphene	Trace	400	
Calcite	Trace		Microgranular
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Tourmaline	up to 1	400–800	Violet-blue.
Opaque	up to 1	up to 2 mm	

TEXTURAL DESCRIPTION: This rock has a composite fabric with two different compositional layers or bands, parallel to the main foliation (S3). At the right end of the thin section a calcite-bearing breccia fills a vein oblique to the foliation. Around this vein there are randomly oriented grains of large green biotite, sphene, and calcite. Cemented, inequigranular and homogeneous breccia contains angular quartz grains surrounded by a microgranular calcite cement. Rare fragments of biotite needles, plagioclase, and muscovite are also present. The three domains distinguished in the rock are: DOMAIN 1: Microgranular domain with a well defined foliation with oriented biotite, opaque oxide (ilmenite?), sub-idiomorphic plagioclase, cordierite, and minor sillimanite needles. Small plagioclase crystals with myrmekitic intergrowth in their borders also occur. Some plagioclase crystals are slightly zoned. Some plagioclase, K-feldspar, and cordierite grains are poikilitic, and have grown over the foliation including oriented biotite. These textural observations support a post-S3 growth of these minerals. DOMAIN 2: Inequigranular in texture, with large (up to 2–3 mm) cordierite, quartz, plagioclase, and minor K-feldspar. Anhedral cordierite is corroded, fractured, and transformed in rims to sericite. DOMAIN 3: with concentrations of large green biotite, calcite, and sphene. The textural position of garnet is unclear. The one grain in the thin-section is idiomorphic, small, without inclusions, and is surrounded by decussate biotite crystals, not parallel to S3. In consequence, the transformation (incipient) to biotite seems to have occurred after S3, and consequently we have assigned garnet to syn-D3.

161-976B-101R-2 (Piece 3A)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	20	up to 800	
Plagioclase	25	100–500	
K-feldspar	25	up to 2 mm	
Biotite	15	100–700	Green.
Sillimanite	10	10–8 mm	
Cordierite	3	300	
Andalusite	Trace	300	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	Trace	50–100	Transformation of cordierite.
Calcite	Trace	Microcrystalline	Present in alteration products of cordierite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Tourmaline	Trace	100–300	
Opaque	2	80–800	
Apatite	Trace	100	

TEXTURAL DESCRIPTION: Cordierite-bearing gneiss, with a main foliation (S3) defined by the orientation of biotite, plagioclase, quartz, cordierite, tourmaline, opaque elongated grains, and apatite. Biotite is locally recrystallized transverse to the S3 foliation, from oriented grains. Sillimanite appears as small (5–200 μm) fibrolite needles, included in plagioclase and quartz, usually parallel to the external foliation, although examples of randomly oriented fibers are also seen. Fibrolite aggregates are usually deformed and elongate parallel to S3. These two textural positions of sillimanite indicate that it was stable during D3 and after D3. K-feldspar appears as large porphyroblasts, including abundant grains of surrounded quartz, apatite, and biotite, parallel to S3. Cordierite is scarce, corroded, and largely transformed to muscovite. Andalusite seems to be pre-S3 foliation. The coexistence of K-feldspar and cordierite during and after D3 is remarkable.

161-976B-102R-1 (Piece 3)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	10	300–400	
Plagioclase	10	600–900	
Biotite	15	up to 600	Green.
Cordierite	35	up to 6 mm	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	25	50–100	Transformation of cordierite.
Chlorite (Chamosite)	Trace	400–800	Large crystals with muscovite around cordierite. Also as reaction product from biotite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Tourmaline	Trace	150	
Opaque	5	50–150	

TEXTURAL DESCRIPTION: Rock with large cordierite porphyroblasts, and with a poorly defined foliation in the most places due to the overprint of muscovite and chlorite. The foliation is seen in thin (< 200 μm) bands of biotite, opaque minerals, and tourmaline. Some muscovite grains also grow mimetically parallel to this foliation. Cordierite is largely broken, and fragments are oriented parallel to the main foliation. Abundant inclusions of opaque minerals inside cordierite have rounded shapes (whereas in the matrix the majority of the opaque crystals are parallel to the foliation). This textural relationship supports the attribution of the planar fabric to S3. Muscovite aggregates around cordierite, in conjunction with chlorite replacing biotite, is an expression of their post-D3 growth. Plagioclase (feldspar ?) grows over corroded cordierite, suggesting a post-D3 (syn-D3 ?) growth.

161-976B-104R-1 (Piece 4)
ROCK NAME: GRANITE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	50	50–500	
Plagioclase	10	100–250	Sometimes zoned. Euhedral crystals.
K-feldspar	25	300	Anhedral.
Biotite	15	100–300	Pleochroic in green and also brown grains.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite	Trace	200	(Chamosite). In aggregates overprinting the main foliation.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Opaque	Trace	100–150	
Apatite	Trace	30–150	

TEXTURAL DESCRIPTION: Microgranular granite, with a foliation defined by elongate quartz, plagioclase, and K-feldspar grains. In particular, this fabric is evident in bands with small quartz grains (< 50 μm), abundant evidence of dynamic re-crystallization and tripe points between grains. These bands indicate a mylonitic character of the foliation (S3 ?), with an associated plastic deformation of quartz and plagioclase.

161-976B-104R-1 (Piece 9A)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Plagioclase	20	up to 400	Idiomorphic twinned crystals.
Pyroxene (Diopside)	40	up to 1.5 mm	Light pale-green to colorless.
Amphibole	20	500–2 mm	Pale green in color.
Garnet	Trace	up to 2.8 mm	Subhedral, partly corroded by plagioclase (?), chlorite, and clay.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite	Trace	200	
Clay-sericite	18–20		Forming a microcrystalline groundmass growing at the expense of pyroxene and amphibole.
Calcite	Trace	up to 800	In the clay aggregates as microcrystalline grains, and in a vein crosscutting the thin-section.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sphene	up to 2	200–400	Idiomorphic crystals.
Apatite	Trace	50–100	
Tourmaline	Trace	100	Dark green in color.
Epidote	Trace	< 50	Dispersed in the groundmass.

TEXTURAL DESCRIPTION: Rock formed by a groundmass of calcite, clay, and chlorite, surrounding preserved domains with plagioclase, pyroxene, and amphibole as randomly oriented idiomorphic crystals. Usually amphibole is more altered than pyroxene (probable of the diopside-hedenbergite series). Sphene is present as idiomorphic crystals, randomly oriented in the matrix. Garnet appears as atoll-shape grains with clay cores, and as large "spongy" grains largely corroded by plagioclase and the matrix.

161-976B-106R-1 (Piece 11A)
ROCK NAME: GNEISS

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	30	200–800	
Plagioclase	15	100–200	Commonly twinned, and sometimes zoned. Idiomorphic in the matrix.
K-feldspar	20	up to 2 mm	With abundant inclusions (opaque and biotite) parallel to the main foliation.
Biotite	13	100–500	Green.
Cordierite	15	up to 2 mm	Corroded grains.
Sillimanite-fibrolite	2	up to 700	In large fibrous aggregates
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Muscovite	5	300–600	Partly replacing biotite, and corroding cordierite.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Apatite	Trace	80–120	
Tourmaline	Trace	100	Dark green in color.
Opaque	Trace	100–600	Dispersed in the groundmass.

TEXTURAL DESCRIPTION: Foliation in the rock is defined by elongate aggregates of fibrolite, biotite, partly replaced by muscovite, opaque minerals, plagioclase, quartz, and apatite in subordinate amounts. This foliation (which in view of the deformation of sillimanite can be considered as S3) is crenulated by open to tight folds, that usually are nucleated around relict cordierite. Muscovite, grown mimetically from biotite and cordierite, is parallel to the axial plane of the folds (post-D3 deformation). Cordierite is overprinted by oriented muscovite grains. Sillimanite-fibrolite is preserved as thin randomly oriented needles inside plagioclase, quartz, and K-feldspar grains.

161-976E-14R-1 (Piece 3B)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	40	100–1000	Granoblastic. Coarse in veins.
Plagioclase	25	100–600	Untwinned.
Biotite	25	100–200	
Sillimanite	Trace	1000	Fibrolitic and prismatic.
Garnet	10	3000	Porphyroblastic.
Staurolite	Trace	200	Included in plagioclase.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite	Trace	<5	Dust in plagioclase.
Opaque Oxide	Trace	200	
Tourmaline	Trace	50	Abundant in some layers.
Zircon	Trace	10	

TEXTURAL DESCRIPTION: The main fabric element is an early foliation defined by compositional layering, 1 mm quartz and biotite laminae, and oriented biotite, fibrolite and prismatic sillimanite. This is locally microfolded. Plagioclase porphyroblasts have central elongate cores densely crowded with graphite inclusions that define an internal fabric parallel to the external foliation, and narrow calcic rims that are free of graphite. There are also some larger grains of late clear plagioclase. Fibrolite mats partly replace the biotite, and tend to be oriented parallel to the early foliation, or to the crenulation cleavage where this is strong. Garnet also has graphite and quartz inclusions; these are moderately rotated with respect to the external fabric, and some have curved trails suggesting some growth during rotation. One grain has what appear to be recrystallized tails, with a clear delta-type geometry: the sense of shear is consistent with the sense of rotation indicated by the inclusion trails. Another has rims that have grown over the microfolds in the foliation. Staurolite is rare and only preserved as inclusions in plagioclase.

Summary:

	plagioclase	calcic rims	
D2 crenulations		garnet	sillimanite
	plagioclase	garnet	staurolite
D1: main foliation biotite			

161-976E-15R-1 (Piece 5A)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	15	100	Granoblastic, with plagioclase in discrete layers.
Plagioclase	25	100	Granoblastic. Also 200–300 μm poikiloblasts with graphite.
K-feldspar	10	100	Granoblastic, with calcite in discrete layers.
Biotite	5	100	
Calcite	40	50–200	Granoblastic.
Scapolite	10	Up to 10 mm	Elongate parallel to foliation. Intergrown as blades with granular calcite.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Chlorite	Trace	500	

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite	Trace	<5	Dust.
Sphene	Trace	50	In trails parallel to foliation.
Opaque Oxide	Trace	200	

TEXTURAL DESCRIPTION:

161-976E-15R-1, Piece 5B
ROCK NAME: CALC-SILICATE ROCK/HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite		850–4000	
Plagioclase		120	Clean crystals without inclusions, subidiomorphic, rounded.
Biotite		100–150	
Quartz		80–300	
Sillimanite			

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
White Mica			Sericite aggregates.
Chlorite		200	Chamosite. Relict cores of biotite.
Clay			

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite			
Opaque Oxide			
Sphene		100–150	

TEXTURAL DESCRIPTION: The rock has two clearly distinguishable compositional domains, marble and schist. DOMAIN 1: Calcite-rich marble with coarse calcite, rare intergranular twinned crystals of plagioclase (250 μm), biotite (pale brown to brown pleochroism), and randomly distributed rounded crystals of quartz. The foliation is defined by elongate calcite and trails of graphite and opaque minerals. On the boundary between domains 1 and 2 there are aggregates of sericite, isolated crystals of chlorite (chamosite), clay minerals, and oriented aggregates of sphene. Rare crystals of plagioclase (50 μm) and quartz form a band parallel to the marble domain, near the contact with the schist domain. DOMAIN 2: Schist with quartz, biotite, and plagioclase. Small bands (up to 100 μm) of calcite and sphene lie parallel to the main foliation in the domain, which is defined by elongate quartz with undulatory extinction, oriented large plagioclase with abundant inclusions of graphite and ilmenite, and biotite. Rare sillimanite is present away from the marble domain. The foliation is slightly deformed by asymmetric open folds without any associated crenulation cleavage.

161-976E-15R-1 (Piece 6B)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite			
Plagioclase		170–500	
Biotite			
Clinopyroxene		700–1600	Pale green, partly transformed in places to chlorite and sericite. (Diopside?)
Scapolite			

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
White Mica			Sericite aggregates.
Chlorite			

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz			
Graphite			
Ilmenite			
Sphene		200–300	
Spinel			

TEXTURAL DESCRIPTION: The foliation is defined by mm-scale alternating compositional bands, which is isoclinally folded, together with clinopyroxene, biotite, plagioclase, and sphene. Large porphyroblasts of clinopyroxene are oriented in the foliation, broken and rotated around the folds. The bands are composed of calcite-clinopyroxene-plagioclase-scapolite (more abundant), and quartz-biotite-plagioclase (less abundant). Scapolite forms large poikiloblasts with many inclusions of clinopyroxene. These may be forming from the clinopyroxene, and postdate the deformation.

161-976E-17R-1 (Piece 5)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite	50–70	1.2 mm	
Plagioclase	5–10	100–600	
Biotite	5	400	Partly altered to chlorite.
Clinopyroxene	20–40		Pale green, partly transformed in places to chlorite and sericite. (Diopside?)
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite		1.6 mm	
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite			
Opaque Oxide			
Sphene	< 2	800	

TEXTURAL DESCRIPTION: The rock has a strong foliation defined by elongate clinopyroxene grains (probably Diopside)and trains of grains that have a common crystallographic orientation. Plagioclase forms small clean twinned idiomorphic grains in the matrix, of variable size (commonly 100–200 μm, maximum 600–800 μm), commonly associated spatially with clinopyroxene. Other plagioclase grains are allotriomorphic, elongate parallel to the foliation and have abundant inclusions of graphite and biotite parallel to the external foliation. It appears to have grown in two stages: the first before the main foliation, associated with calcite + clinopyroxene + biotite + sphene + graphite; and the second after the foliation. The latest plagioclase is also deformed and is confined to domains between coarse calcite-bearing bands. Possibly the main foliation has been reactivated during a later deformation, which has deformed and reoriented all the minerals and generated fine-grained bands with plagioclase (<100 μm), clinopyroxene, and sphene.

161-976E-17R-1 (Piece 7A, Interval 104–109)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	70	80–2 mm	
Plagioclase	20	100–1.2 mm	
Biotite	7	up to 120	Dark-brown to reddish-brown.
Clinopyroxene	2	1.5 mm	Pale-green to green. Probably from the diopside-hedenbergite series.
Ortho-amphibole	1	700	White, well-developed cleavage, straight extinction.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite	Trace	200	Retrogressive mineral from biotite.
Muscovite	Trace	< 90	
Clay (?)-sericite	Trace	< 50	Scattered, small crystals in the matrix, and corroding pyroxene and amphibole.
Calcite	Trace		Microcrystalline grains growing at expense of pyroxene and amphibole.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace		
Opaque Oxide	Trace		
Apatite	Trace	25	
Sphene	Trace	100–680	Idiomorphic.

TEXTURAL DESCRIPTION: Foliation in the rock is defined by oriented pyroxene, amphibole, biotite, quartz, plagioclase, and sphene. This foliation is folded at one edge of the thin-section. Biotite-rich domain of the rock is usually rich in graphite, and abundant plagioclase grows over the foliation.

161-976E-17R-1 (Piece 7A, Interval 114–117)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz		100–800	
Plagioclase		up to 500	Commonly is twinned.
Biotite		150–220	
Clinopyroxene		1.5 mm	Pale-green to green. Probably from the diopside-hedenbergite series.
Ortho-amphibole		700	White, well-developed cleavage, straight extinction.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite (Chamosite)	Trace	300	Retrogressive mineral from pyroxene and amphibole.
Clay (?)-sericite	Trace	< 50	Retrogressive mineral from pyroxene and amphibole.
Calcite	Trace		Micro-crystalline grains growing at expenses of pyroxene and amphibole.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite	Trace		
Opaque Oxide	Trace	up to 200	
Spinel	Trace	< 100	Green spinel.
Sphene	Trace	80–150	Idiomorphic.
Rutile			

TEXTURAL DESCRIPTION:
Rock with a foliation defined by oriented pyroxene, amphibole (discussed to be olivine ?), plagioclase, and biotite. Large plagioclase (up to 800 μm) and amphibole are preferentially concentrated in fold cores. There are two different domains parallel to the main foliation in the thin-section: DOMAIN 1: with biotite (20%), quartz (65%), and plagioclase (15%). Calcite, green spinel, tourmaline, and apatite are accessories. DOMAIN 2: with calcite (75%), large plagioclase (10–20%), pyroxene and amphibole (15–5%). Sphene, rutile, graphite, opaque minerals, and chlorite are present as accessory minerals. The foliation is defined by bands with different compositions.

161-976E-17R-2 (Piece 1)
ROCK NAME: HIGH GRADE SCHIST/MARBLE

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	20	100–300	Granoblastic to irregular, with interstitial calcite.
Plagioclase	60	100–700	Granoblastic, with quartz; and elongate porphyroblasts with graphite trails. Twinned. 38°
K-feldspar	5	100	Granoblastic, mainly in veinlets.
Biotite	5	100	
Calcite	5	1–2 mm	Granoblastic.
Clino-amphibole	5	200	Pale green. Heavily altered to clay.
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite	Trace	100	Retrogressive from biotite.
Clay	Trace		Green clay, formed from amphibole, preferentially located at the marble-schist boundary. Also a vein of green clay.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Sphene	Trace	50	
Opaque Oxide	Trace	100	
Graphite	Trace	< 5	Dust in plagioclase.

TEXTURAL DESCRIPTION: The rock is layered, with 2–5 mm bands composed of quartz + plagioclase + biotite, pure K-feldspar (layer 400 μm thick), coarse-grained quartz and amphibole, and calcite. Biotite is well oriented parallel to layering.

161-976E-20R-1 (Piece 9)
ROCK NAME: BRECCIA

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite	95		
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Ankerite	Trace		
Quartz	Trace		
K-feldspar	Trace		
Phlogopite	Trace		
White Mica	Trace		
Chlorite	Trace		
Opaque Oxide	Trace		
Clay	Trace		

TEXTURAL DESCRIPTION: Angular to subrounded fragments of phlogopite-bearing marble in a carbonate matrix. Marble: grain size 0.5 mm, granoblastic. Matrix has variably oriented carbonate grains down to 5 μm or less. No fabric. Dispersed fragments of calcite and other minerals listed above; variable grain size up to 0.5 mm, angular. Zoned idiomorphic crystal of ankerite or similar. No detectable fossils.

161-976E-20R-1 (Piece 11A)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite	30	500–2000	Granoblastic, mainly in layers or veins.
Plagioclase	2	100–800	Calcic.
K-feldspar	15	100–400	2V=30°, -ve: orthoclase.
Muscovite	50	500–2000	
Biotite	2	200	
Corundum	1	Up to 1500	
Diopside	Trace	100	
Symplectite	Trace		orthopyroxene + K-feldspar?

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Sericite	Trace		
Clay	Trace		

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite	Trace	<5	Dust.
Apatite	Trace	Up to 1.2 mm	
Opaque Oxide	Trace	Up to 500	
Rutile	Trace		
Tourmaline	Trace	20–80	

TEXTURAL DESCRIPTION: The rock has two layers or domains. One is composed mainly of calcite, with dispersed K-feldspar; the other is made up mainly of muscovite. K-feldspar occurs in calcite layers, concentrated in boudin necks with opaque ore, and is widespread in muscovite layer. Muscovite forms very large plates, partly altered to corundum and K-feldspar. Corundum forms large irregular porphyroblasts in muscovite, surrounded by a halo of K-feldspar, and with oriented inclusions of very fine-grained rutile. Biotite is dispersed in muscovite, and appears to be altered to symplectite. The latter consists of regularly oriented trains of elongate grains of colorless high-relief mineral, straight extinction, length slow, in K-feldspar. This could be orthopyroxene + K-feldspar forming from biotite. Sericite appears to make up pseudomorphs up to 1 mm, but one of these has graphite trails defining an isoclinal microfold. The sericite aggregates contain abundant minute crystals of rutile.

161-976E-20R-1 (Piece 14)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	20	50–100	Granoblastic, up to 500 μm in veins.
Plagioclase	40	200–500	Untwinned.
K-feldspar	5	10–40	Interstitial in quartz-rich layers.
Biotite	20	100–200	
Sillimanite	10	1000	Fibrolitic and prismatic.
Andalusite	5	4000	Poikiloblastic, inclusions of biotite.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite	Trace	<5	Dust in plagioclase.
Magnetite	Trace	50	
Tourmaline	Trace	50	Abundant in some layers.
Apatite	Trace	30–80	

TEXTURAL DESCRIPTION: The main fabric elements are an early foliation defined by 1 mm quartz and biotite laminae and oriented biotite, and a crenulation cleavage. Plagioclase porphyroblasts have central cores with graphite inclusions that define a rotated internal fabric, and narrow calcic rims that are free of graphite.

161-976E-20R-2 (Piece 2)
ROCK NAME: BRECCIA

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite			
Ankerite/dolomite			Zoned idiomorphic crystals.
Quartz			
K-feldspar			
Plagioclase			
Phlogopite/biotite			
Muscovite			
Cordierite?			
Clay			

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

TEXTURAL DESCRIPTION: Angular fragments of marble (grain size 0.5–1 mm, granoblastic), quartz-plagioclase gneiss, and vein quartz. Angular crystal fragments, mainly of carbonate, but also of all the other minerals listed above. Matrix has variably oriented carbonate grains from 500 μm down to 5 μm or less. No fabric. No detectable fossils.

161-976E-21R-1 (Piece 5)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Plagioclase		100–1000	Relict elongate graphite-rich porphyroblasts; small clear granoblastic.
K-feldspar		100	Granoblastic in segregations, plus some interspersed with plagioclase.
Biotite		100–200	
Sillimanite		500	Bundles of finely prismatic sillimanite.
Andalusite		2–5 mm	Poikiloblastic, inclusions of biotite and graphite.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Muscovite	Trace		After andalusite.

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Quartz	Trace	100	Irregular in some K-feldspar segregations.
Graphite	Trace	<5	Dust in plagioclase.
Tourmaline	Trace	50	Abundant in some layers.
Zircon	Trace	10	

TEXTURAL DESCRIPTION: The rock has a complex fabric. Elongate plagioclase with graphite trails define an early foliation, say S1. Over much of the slide the plagioclase alternates with biotite on a 0.5 mm scale to define a differentiated layering parallel to S1. Locally relict plagioclase grains are folded around 2 mm tight crenulations. These appear to be crenulations of S1 (i.e., the crenulation cleavage is S2), but the crenulations are tight, and S2 is parallel to S1 outside the fold. So these could in fact be D1 crenulations. Plagioclase is now recrystallized, so it is not clear whether crystals are rotated around crenulations or grew over crenulated fabric, although the former looks more likely. Sillimanite also locally appears to follow around the crenulations. S1 is also affected elsewhere in the thin section by very open crenulations with axial planes at a very high angle to S1, and hence also to the possible S2. Biotite and sillimanite are extensively reoriented parallel to the axial planes of these crenulations. So is this S3? Late clear plagioclase grows over biotite and appears unaffected by crenulations (i.e., post-S3). Andalusite also grows over S1, and it includes biotite that is oriented parallel to S3. So in terms of its relationship to minerals S3 in this thin section seems equivalent to S2 elsewhere.

161-976E-21R-3 (Piece 1)
ROCK NAME: CALC-SILICATE ROCK/HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite		300-1200	Elongate grains parallel to foliation.
Plagioclase		<100	Twinned.
Biotite		600	Always parallel to foliation.
Diopside		600	Pale green to colorless, associated with amphibole, largely transformed to clay.
Amphibole		900	Allotriomorphic, pleochroic dark green to greenish yellow.
Garnet		4000	
Quartz		100	
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Clay			Golden green microcrystalline aggregates forming from pyroxene.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite			
Apatite			
Opaque Oxide			
Rutile			
Sphene			
Epidote			Straight extinction, blue interference colors.

TEXTURAL DESCRIPTION: The rock is well foliated with compositional bands 5-8 mm in thickness. BAND 1: Calcite + plagioclase + amphibole + biotite, with minor rutile, opaque oxide, graphite and apatite. Biotite commonly surrounds amphibole, or forms large aggregates of flaky crystals, in either case parallel to the foliation. Rare large idiomorphic biotite has grown over the foliation, with inclusions of opaque oxide parallel to the external foliation. Rutile is partly transformed to ilmenite, parallel to the foliation. BAND 2: Schist with biotite and graphite, fined-grained quartz and twinned plagioclase defining the foliation. BAND 3: Coarse-grained with garnet + plagioclase + amphibole + pyroxene + sphene. Garnet is large, spongy, with multiple arms, and has idiomorphic inclusions of sphene. It is commonly surrounded by light-green to colorless pyroxene, and is multiply intergrown with plagioclase and pyroxene. Some grains are so big they cross the entire thin section.

161-976E-22R-2 (Piece 12)
ROCK NAME: CALC-SILICATE ROCK

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Calcite		1600	Needles parallel to foliation, in a matrix of plagioclase and quartz.
Plagioclase		50–900	50–150 μm in matrix , 600–900 subidiomorphic crystals with garnet. Twinned.
Biotite		600	Parallel to foliation.
Diopside		600	Pale green to green.
Sillimanite			Fibrolite growing from biotite.
Andalusite		400	One grain, parallel to the foliation, with inclusions of biotite parallel to the foliation.
Garnet		2800	
Quartz			
RETROGRESSIVE MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Chlorite		100–150	
Clay			Golden green-yellow aggregates up to 8 mm.
ACCESSORY MINERALS	**PERCENT PRESENT**	**SIZE (μm)**	**COMMENTS**
Graphite			Parallel to the foliation.
Opaque Oxide		50	
Rutile			
Sphene		200–300	Idiomorphic.
Epidote		350	Pale green.

TEXTURAL DESCRIPTION: The rock is foliated with highly variable compositional bands defining a foliation. This fabric is isoclinally folded and transposed; biotite has grown parallel to the axial plane. BAND 1: Biotite + quartz + plagioclase. The foliation is defined by coarse-grained biotite. Twinned plagioclase has grown over the foliation. The amount of biotite and its grain size diminishes towards the calcite-bearing band. Fibrolite has formed from biotite, and is also parallel to the foliation. There is one grain of andalusite, parallel to the foliation, with inclusions of biotite parallel to the foliation. BAND 2: Rich in plagioclase, with rare idiomorphic epidote, and sphene. BAND 3: Coarse-grained domain of plagioclase, garnet, sphene, and calcite, in which the minerals have been partly pseudomorphed by clay minerals. Clean garnet has been broken up with subidiomorphic plagioclase growing over the grains. Pyroxene is totally or partly transformed to calcite and clay minerals forming a disseminated aggregate.

161-976E-25R-2 (Piece 11)
ROCK NAME: HIGH-GRADE SCHIST

PRIMARY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Plagioclase			
K-feldspar			
Biotite			
Sillimanite		1.2 mm	Fibrolite aggregates.
Andalusite		5.2–6 mm	
Staurolite			Included in plagioclase and andalusite.

RETROGRESSIVE MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS

ACCESSORY MINERALS	PERCENT PRESENT	SIZE (μm)	COMMENTS
Graphite			
Ilmenite			
Rutile			
Tourmaline			
Quartz			

TEXTURAL DESCRIPTION: Biotite schist with variable composition. In some domains the rock is composed only of biotite. Lenticular fibrolite aggregates lie parallel to the foliation, and have grown mimetically after biotite. Locally they grow across the foliation. Andalusite forms large subidiomorphic to idiomorphic porphyroblasts that have grown randomly over the foliation. Andalusite is more abundant where there is less sillimanite. Some porphyroblasts have been broken and biotite has grown randomly between the fragments. Plagioclase has ilmenite and graphite inclusions defining folded inclusion trails. Staurolite only occurs as corroded grains enclosed in plagioclase or andalusite.