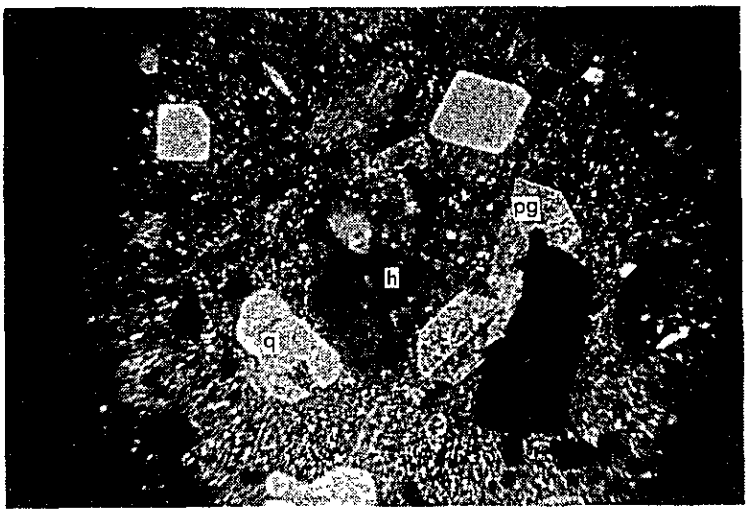
Microscopic observation of thin section



q : quartz
h : hornblende
pg : plagioclase

Crossed nicols × 4

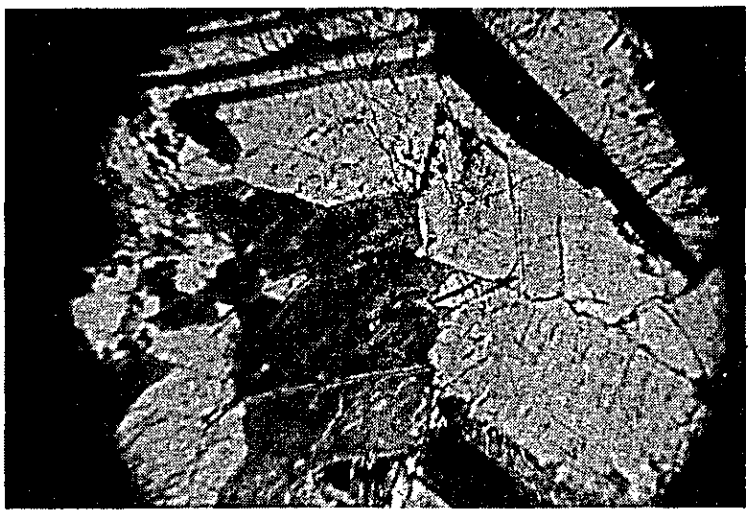
0 0.75 1.5 mm

1.	Sample No. :	D-40
2.	Laboratory No. :	AR - 10078
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzurum, i-45, a1, No.4
6.	Coordinates :	17.20 N, 32.35 E
7.	Location :	Köy Tepe, Çırmıt köyü, Aşkale, Erzurum
8.	Lithostratigraphic unit :	intrusive rocks
9.	Rock name :	quartz porphyry
10.	Occurrence :	dyke in harzburgite
11.	Description of specimen :	This specimen is pale gray colored and porphyritic. Phenocrysts are composed of acicular hornblende and plagioclase.

12. Microscopy :

The specimen is porphyritic in texture.
Phenocrysts are composed of large amount of hornblende and plagioclase accompanied by quartz.
Hornblende is greenish brown colored, euhedral, long prismatic (1 mm long) and frequently twinned.
Plagioclase is euhedral, prismatic, (0.5 - 2 mm long) twinned and zoned. It is albitized, kaolinized and epidotized.
Quartz has euhedral shape, 0.5 - 1 mm size and corroded form in part.
Microphenocrysts of euhedral apatite are present.
Groundmass is composed of aggregates of very fine grained anhedral quartz, plagioclase and potash feldspar?

Microscopic observation of thin section



left half : hornblende
right half : plagioclase

Crossed nicols × 4

0 0.75 1.5 mm

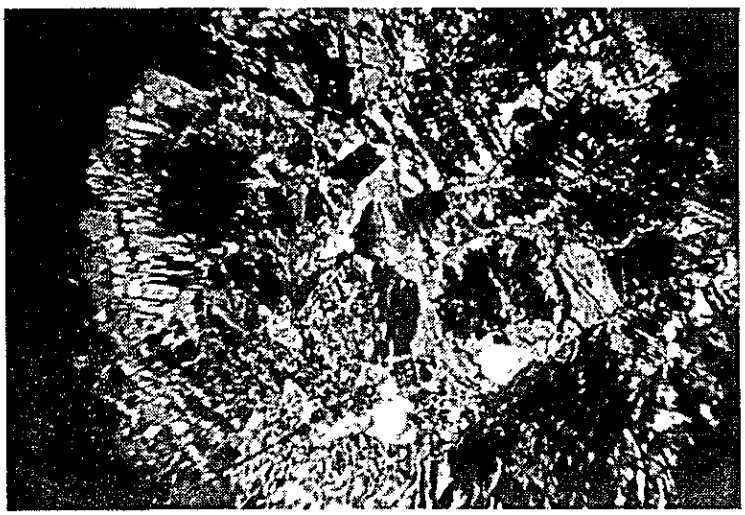
1.	Sample No. :	D-45
2.	Laboratory No. :	AR - 10081
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzurum, i-45, a4, No.1
6.	Coordinates :	14.85N, 31.17E
7.	Location :	Çırmıt Tepe, Aşkale, Erzurum
8.	Lithostratigraphic unit :	intrusive rocks
9.	Rock name :	pyroxene hornblende quartz gabbro
10.	Occurrence :	stock
11.	Description of specimen :	This specimen is dark green colored and composed of granular pyroxene, tabular hornblende and irregular shaped feldspar.
12.	Microscopy :	The specimen is coarse grained and subhedral in texture. Pyroxene (augite) has short prismatic, corroded shape and occurs at the core of hornblende. Hornblende has brownish color and anhedral shape. It includes small prismatic crystals of plagioclase poikilitically. It alters to chlorite. Plagioclase has euhedral-subhedral prismatic shape. It is remarkably twinned. Quartz is present filling up the plagioclase crystals. Veins of chlorite and carbonate mineral are found.

Microscopic observation of thin section

ov : serpentine from olivine
dp : diopside
(black part is contaminated by Fe-mineral)

Parallel nicol × 4

0 0.75 1.5 mm

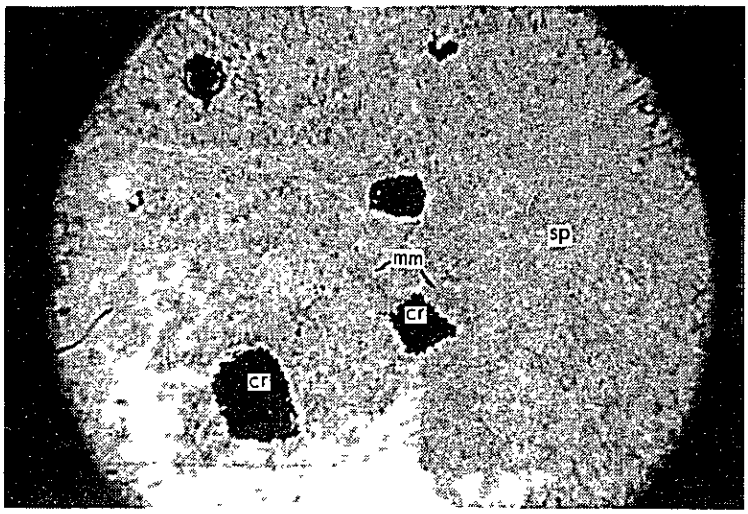


Crossed nicols × 4

0 0.75 1.5 mm

1. Sample No. : D-57
2. Laboratory No. : AR-10106
3. Project No. : 78/26
4. Area : Kopdağ
5. Map No. : Trabzon, H-44, c3, No.4
6. Coordinates : 29.90N, 18.64E
7. Location : Coşan ocak, Iskınlığındere, Kop, Bayburt, Gümüşhane
8. Lithostratigraphic unit : ultrabasic rocks
9. Rock name : wehrlite
10. Occurrence : dyke in dunite
11. Description of specimen : This specimen is black colored. Serpentine is found commonly.
12. Microscopy : The specimen is coarse grained.
It is composed of clinopyroxene followed by olivine.
Olivine is mostly altered to serpentine.
Brucite fills the pseudomorph of olivine crystals.
Clinopyroxene (diopside) is coarse grained, short prismatic and contaminated by Fe-mineral. It is partly replaced by serpentine.
Carbonate vein is found.

Microscopic observation of thin section



cr : chromite
mm : Fe-montmorillonite
sp : serpentine

Parallel nicol × 4

0 0.75 1.5 mm

1.	Sample No. :	D-58
2.	Laboratory No. :	AR - 10107
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	28.12 N, 16.82 E
7.	Location :	Batı Coşan, Bendindere, Sıçankale Y., Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	serpentinite from dunite
10.	Occurrence :	massive
11.	Description of specimen :	This specimen is black colored (partly brownish due to the weathering). Fine grained granular chromite disseminates occasionally.
12.	Microscopy :	The specimen is granular and coarse grained. Olivine is completely altered to serpentine and brucite. Chromite is commonly found with round shape and 1 mm size. Very fine magnetite occurs around olivine crystals. Small amount of saponite and Fe-montmorillonite? is present.
13.	Remarks :	refer Appendix 6-11

Microscopic observation of thin section

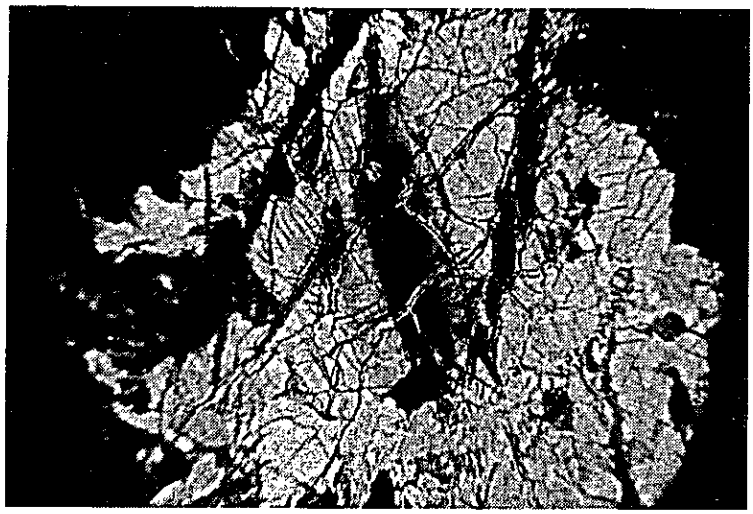
ov : olivine pseudomorph.
dp : diopside
cr : chromite

Crossed nicols × 4

0 0.75 1.5 mm

1.	Sample No. :	X-8
2.	Laboratory No. :	AR - 10097
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	26.80N, 15.75E
7.	Location :	Sivrilerin Sr., Sıçankale Y., Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	olivine clinopyroxenite
10.	Occurrence :	dyke
11.	Description of specimen :	This specimen is greenish grey colored and coarse grained.
12.	Microscopy :	The specimen is equidimensional, coarse granular. Small amount of olivine pseudomorph (0.3 mm) remains. However, olivine is mostly replaced by serpentine. Large amount of clinopyroxene (diopside) is found. It has tabular anhedral shape and 0.5 - 2.0 mm size. It is replaced by clay minerals along the cleavage. Chromite is commonly present. Pale green colored uvarovite is observed.

Microscopic observation of thin section



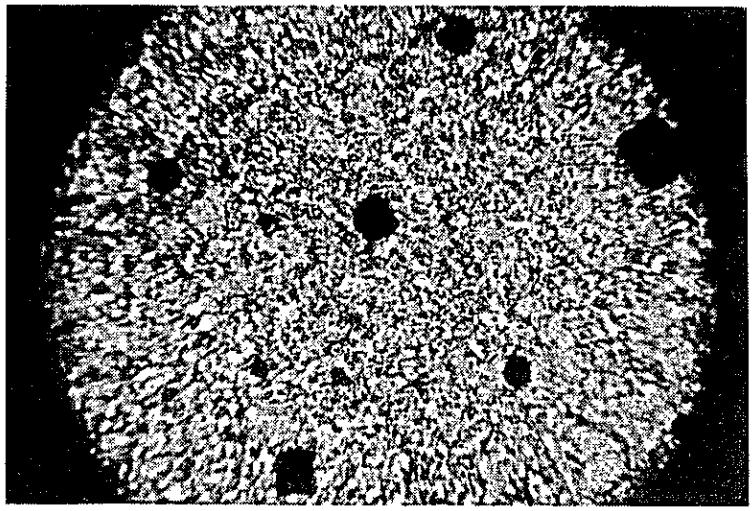
Olivine is suffered
by deformation (center)

Crossed nicols × 4

0 0.75 1.5 mm

1.	Sample No. :	X-12
2.	Laboratory No. :	AR - 10100
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	25.02N, 13.03E
7.	Location :	Taşlı dere, Dingik, Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	harzburgite
10.	Occurrence :	massive
11.	Description of specimen :	This specimen is dark greenish gray colored and medium grained. It has much amount of orthopyroxene crystals and veinlets. It is a typical specimen of harzburgite in the survey area.
12.	Microscopy :	The specimen is equidimensional coarse granular. Olivine is coarse, granular with 1-2 mm size and shows wavy extinction. Small part of it, is replaced by serpentine. Enstatite is coarse, anhedral tabular with 1 - 1.5 mm size and includes small olivine crystals. Chromite of 0.1-1 mm size includes olivine crystals in part. Few clinopyroxene (1 mm size) is present. Oval-shaped plagioclase is replaced by clinozoisite.
13.	Remarks :	refer Appendix 6-14

Microscopic observation of thin section



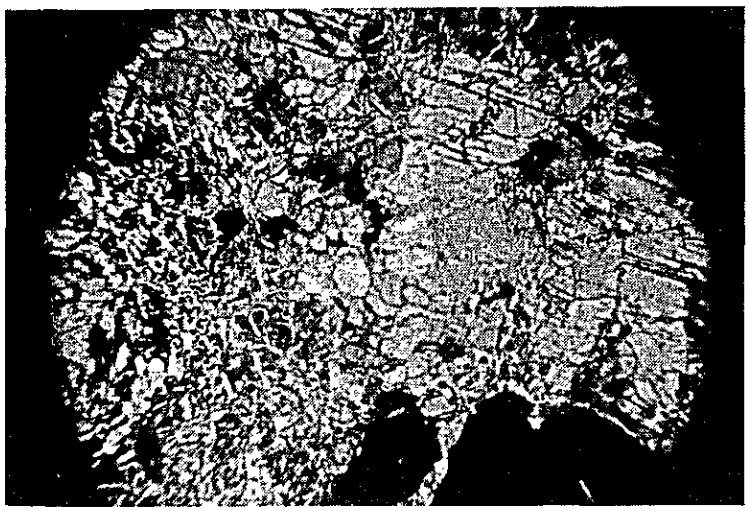
black part : chromite
other part : mainly serpentine with brucite.

Crossed nicols × 4

0 0.75 1.5 mm

1.	Sample No. :	X-14
2.	Laboratory No. :	AR - 10099
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	27.75 N, 17.02 E
7.	Location :	Batı Coşan, Bendindere, Sıçankale Y., Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	brucite-bearing serpentinite from dunite
10.	Occurrence :	massive
11.	Description of specimen :	This specimen is dark gray colored and fine grained. Round coarse grains of olivine? are found in abundance. Very fine granular chromite is present commonly. This is the host rock of chromite deposit and called as fine dunite in the field.
12.	Microscopy :	The specimen shows mesh structure of olivine pseudomorph. Olivine is completely replaced by serpentine and brucite. Chromite has octahedron or hexahedron shape, 0.2 - 0.3 mm size and occurs commonly. Magnetite fine grains are rich around olivine crystals.
13.	Remarks :	This specimen is taken from chromite banding zone, east of Batı Coşan mine. refer Appendix 6-14.

Microscopic observation of thin section



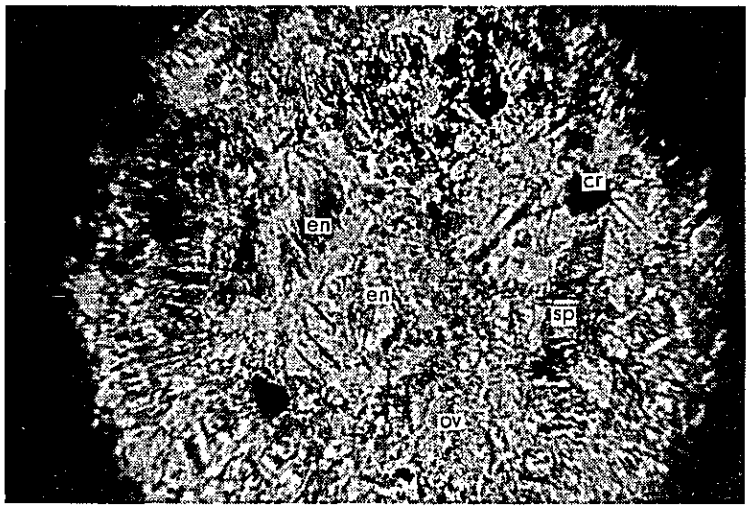
right half : clinopyroxene
left half : olivine
(serpentinized)

Crossed nicols × 4

0 0.75 1.5 mm

1.	Sample No. :	X-15
2.	Laboratory No. :	AR - 10098
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	27.68N, 17.07E
7.	Location :	Batı Coşan, Kücüksivri Sr., Sıçankale Y., Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	olivine clinopyroxenite
10.	Occurrence :	dyke in dunite
11.	Description of specimen :	This specimen is pale yellowish green colored and granular with medium grain size. It is affected by serpentinization.
12.	Microscopy :	The specimen is coarse, equidimensional, granular. Olivine has round shape and 0.5 - 1 mm size. It is completely replaced by serpentine. Clinopyroxene (diopside) is tabular-prismatic, anhedral and 1 - 3 mm long. Its cleavage develops. It is affected partly by chloritization and carbonatization. Clay mineral is present along the cleavage.
13.	Remarks :	Clinopyroxene is determined as augite by X-ray diffractive analysis. refer Appendix 6-15.

Microscopic observation of thin section



ov : olivine (serpentinized)
en : enstatite
cr : chromite
sp : serpentine

Crossed nicols × 4

0 0.75 1.5 mm

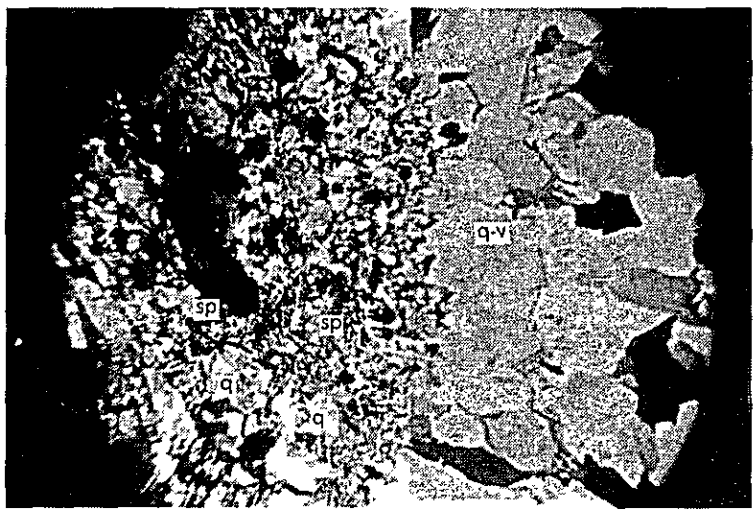
1.	Sample No. :	X-18
2.	Laboratory No. :	AR - 10101
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	27.01 N, 12.15 E
7.	Location :	Kırmıztaş Sr., Sıçankale Y., Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	serpentinite from harzburgite
10.	Occurrence :	massive
11.	Description of specimen :	This specimen has dark grayish green color and very fine grains. Fine networks of serpentine including asbestos are commonly observable.

12. Microscopy :

The specimen is granular.
It is composed of olivine and enstatite.
Olivine is completely replaced by brucite, serpentine and partly saponite?
Enstatite has tabular anhedral shape and 1 - 2 mm size. It includes round olivine crystals partly. It is replaced completely by serpentine and saponite.
Small amount of fine magnetite around olivine and subhedral coarse chromite is present.
Brucite-magnetite-saponite? vein is observed.

13. Remarks : refer Appendix 6-15

Microscopic observation of thin section



sp : serpentine fragment
q : quartz
q-v : quartz vein

Crossed nicols × 4

0 0.75 1.5mm

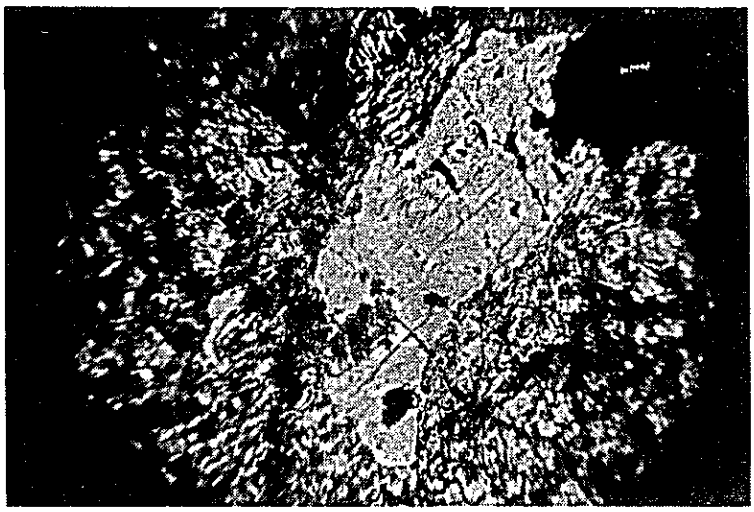
1.	Sample No. :	X-21
2.	Laboratory No. :	AR - 10095
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzurum, i-45, a1, No.4
6.	Coordinates :	16.40N, 33.60E
7.	Location :	Karaçayırdere, Çırmıt köyü, Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	altered serpentinite
10.	Occurrence :	dyke-like appearance in harzburgite
11.	Description of specimen :	This specimen is affected strongly by carbonatization and silicification. It is reddish brown colored and very fine grained. Coarse, round fragments of serpentine and veinlets of carbonate are observed.

12. Microscopy :

The specimen is coarse granular.
Secondary quartz is commonly found. It shows zoning structure and partly euhedral shape in veinlet (1 - 2 mm wide). Carbonate mineral is much in amount. It makes large aggregates. By X-ray diffractive analysis, calcite, dolomite and magnesite are defined. Fine aggregates of magnetite are commonly present. Primary minerals, such as olivine and pyroxene? are completely serpentinized, silicified and carbonatized. So the original rock name cannot be identified. This specimen is affected by serpentinization, lateritization, carbonatization and silicification in order.

13. Remarks : refer Appendix 6-16.

Microscopic observation of thin section



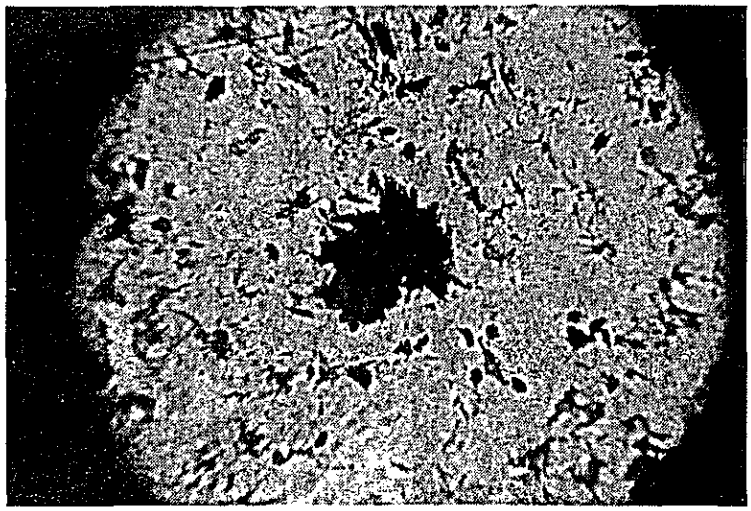
Bright part is enstatite and the rest is serpentine from olivine.

Crossed nicols × 4

0 0.75 1.5mm

1.	Sample No. :	X-22
2.	Laboratory No. :	AR - 10096
3.	Project No. L	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzurum, i-45, a4, No.1
6.	Coordinates :	14.55N, 33.80E
7.	Location :	Kurugöldere, Penek, Aşkale, Erzurum
8.	Lithostratigraphic unit :	ultrabasic rocks
9.	Rock name :	serpentinite from harzburgite
10.	Occurrence :	massive
11.	Description of specimen :	This specimen is brownish dark gray - creamy green colored. Veinlets of pyroxene and asbestos are observed.
12.	Microscopy :	The specimen is equidimensional, granular. It is composed of olivine and pyroxene. Olivine is replaced perfectly by serpentine. Enstatite has anhedral shape and 0.5 - 2 mm size. It is replaced by bustite. Fine crystals of magnetite are rich around olivine crystals. Chromite has warped anhedral shape and 0.5 mm size.

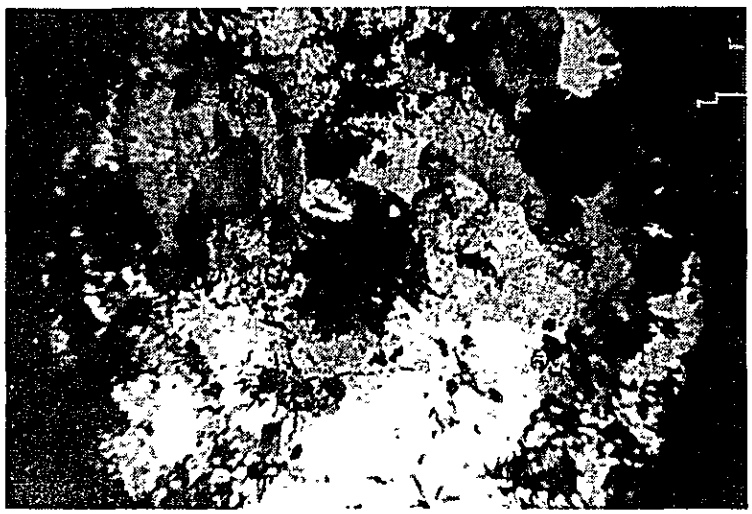
Microscopic observation of thin section



Gray part (center) is aegirine and the rest is mostly natrolite.

Parallel nicol × 4

0 0.75 1.5mm

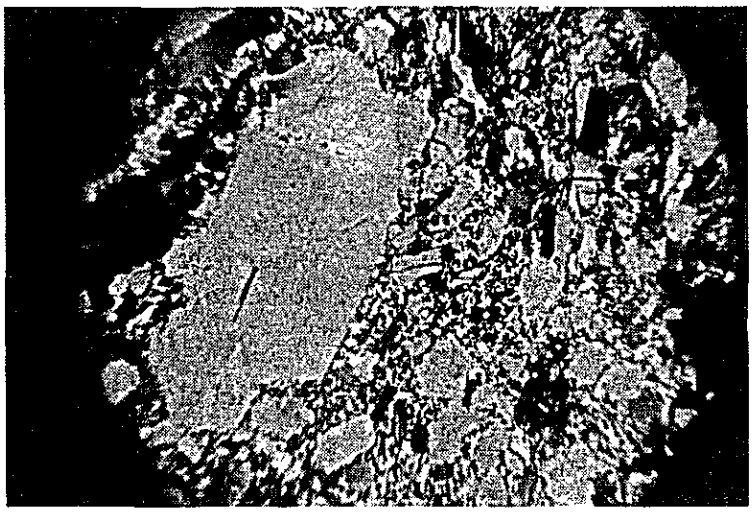


Crossed nicols × 4

0 0.75 1.5mm

1. Sample No. : Z-10
2. Laboratory No. : AR-10092
3. Project No. : 78/26
4. Area : Kopdağ
5. Map No. : Erzincan, i-44, b1, No.1
6. Coordinates : 24.00N, 08.15E
7. Location : Atölendere, Hınzır Mah., Aşkale, Erzurum
8. Lithostratigraphic unit : intrusive rocks
9. Rock name : natrolite rock
10. Occurrence : dyke in harzburgite
11. Description of specimen : This specimen is greenish white colored. Tabular white crystals are abundantly observed.
12. Microscopy : The specimen is coarse grained, anhedral.
    Large amount of natrolite shows anhedral shape of 1-2 mm size.
    Twinned plagioclase is commonly present.
    Prismatic small green crystals of aegirine are present.
    Small amount of sphene, apatite is accompanied.
    Carbonate and chlorite aggregates are commonly present.

Microscopic observation of thin section



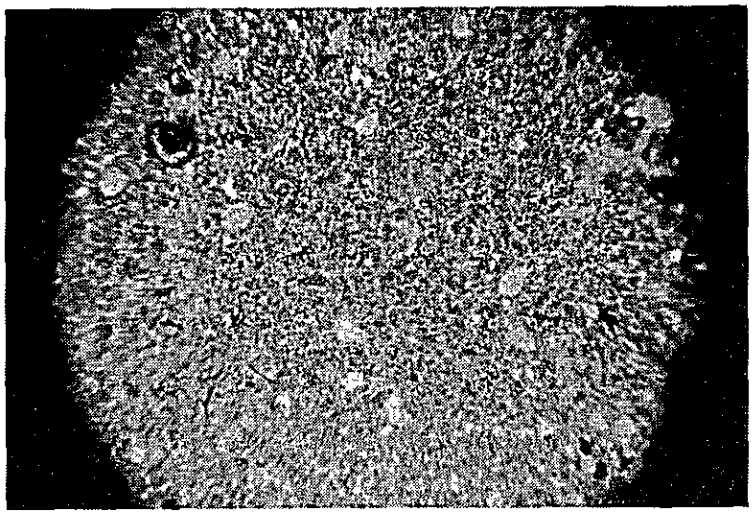
Phenocryst and micro-phenocryst of plagiolcase are given.

Crossed nicols × 4

0 0.75 1.5 mm

1.	Sample No. :	Z-12
2.	Laboratory No. :	AR - 10093
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	23.85 N, 08.17 E
7.	Location :	Topkayanın Tepe, Hınzır Mah., Aşkale, Erzurum
8.	Lithostratigraphic unit :	intrusive rocks
9.	Rock name :	diorite porphyrite
10.	Occurrence :	dyke in harzburgite
11.	Description of specimen :	This specimen is greenish white colored and very fine grained. Phenocrysts are not clear.
12.	Microscopy :	The specimen is porphyritic. Phenocryst is composed of plagioclase. (oligoclase) It is euhedral, prismatic and twinned. Hornblende occurs as microphenocryst. It is yellowish brown colored, prismatic and surrounded by chlorite. Groundmass is composed of anhedral albite.

Microscopic observation of thin section



White parts are druses.
Other part is composed of dolomite.

Parallel nicol × 4

0 0.75 1.5 mm

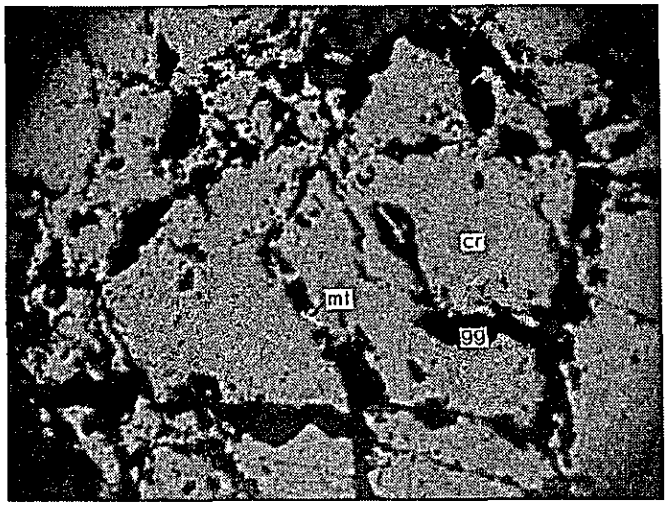
1.	Sample No. :	Z-14
2.	Laboratory No. :	AR - 10094
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	22.14N, 07.20E
7.	Location :	Çerçiilyaş Tepe, Ağcahisar, Aşkale, Erzurum
8.	Lithostratigraphic unit :	terrace deposit
9.	Rock name :	dolomite
10.	Occurrence :	lenticular body intercalated in conglomerate
11.	Description of specimen :	This specimen is creamy white colored, very fine grained and drusy. Tabular crystals are present. (0.2 - 1 cm size)
12.	Microscopy :	The specimen is fine, granular. It is composed of large amount of fine (0.05 mm size), equidimensional granular dolomite. Very small amount of fine feldspar and fine chlorite is present.
12.	Remarks :	refer Appendix 6-16.

APPENDIX 4

Microscopic observations

of polished sections

Microscopic observation of polished section



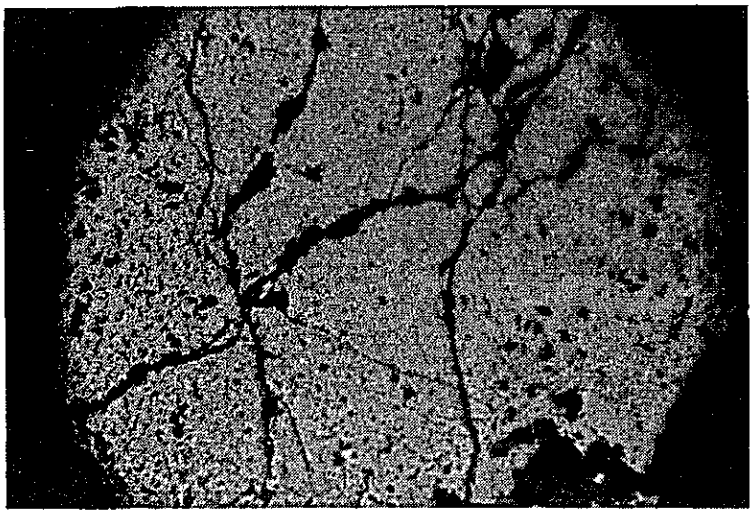
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Acr-7
2.	Laboratory No. :	AR - 1128
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, a2, No.2
6.	Coordinates :	24.32N, 05.21E
7.	Location :	Pembe Gül mine, Keşan Tepe, Cancıkkomu, Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is subround, very coarse grained (0.8 cm) and makes aggregates. Grade of the specimen is estimated to be more than 45 % Cr_2O_3. Gangue minerals are creamy white colored powdery serpentine.
12.	Microscopy :	Chromite makes very coarse aggregates (more than 4 mm). It has subround shape. Fine veinlets of magnetite are present in chromite. Gangue minerals show mesh structure.
13.	Remarks :	This specimen is taken from the stock of ore. refer Appendix 7-11 (TA-11, 12) Plate 7-5 (")

Microscopic observation of polished section



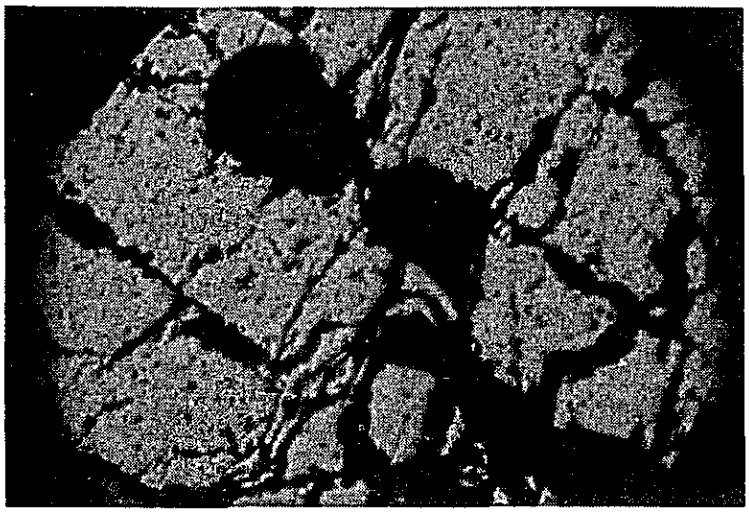
Whole part is composed of chromite. (black part is gangue minerals)

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Acr-12
2.	Laboratory No. :	AR - 1129
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, a2, No.2
6.	Coordinates :	23.78 N, 04.44 E
7.	Location :	Dikyokuş mine, Baltadeğmez Sr., Cancıkkomu, Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	layered
11.	Description of specimen :	Chromite is round, very coarse grained (0.5 mm) and makes aggregates. Grade of the specimen is estimated to be more than 50 % Cr_2O_3. Pale green colored serpentine is observed.
12.	Microscopy :	Chromite is coarse grained, frequently hexahedral and makes aggregates. It is homogeneous and isotropic. Grain size reaches to 2 mm. Gangue minerals fill the cracks of chromite.
13.	Remarks :	This specimen is taken from the stock of ore. refer Appendix 7-10 (TA-10) Plate 7-6 (TA-10)

Microscopic observation of polished section



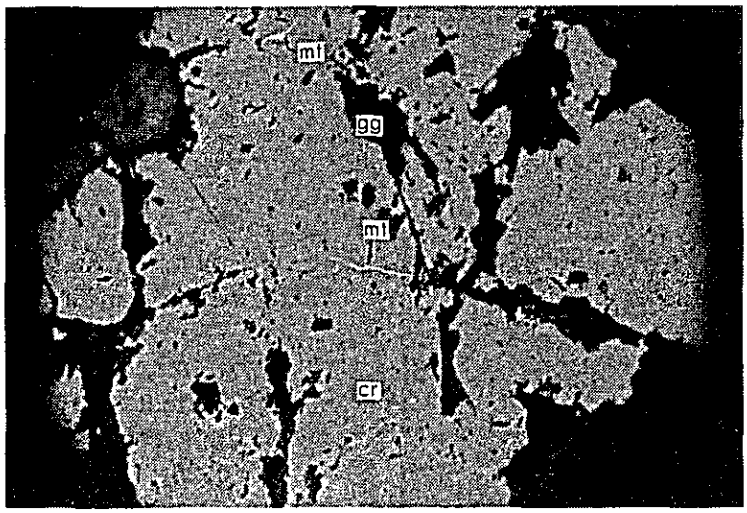
gray part : chromite
black part : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Acr-25
2.	Laboratory No. :	AR - 1126
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, a2, No.1
6.	Coordinates :	21.64N, 99.15E
7.	Location :	Kayınlı dere, Hacıbektaş komu, Çayırlı, Erzincan
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is round, coarse-grained (0.5 mm size) and makes aggregates. Grade of the specimen is estimated to be 45% Cr_2O_3 approximately. Pale green colored serpentine is observed.
12.	Microscopy :	Chromite is very coarse grained and hexahedral. It is isotropic and more than 4 mm in size. Gangue minerals are found with mesh structure in chromite.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 7-21 (TA-21) Plate 7-6 (TA-21)

Microscopic observation of polished section



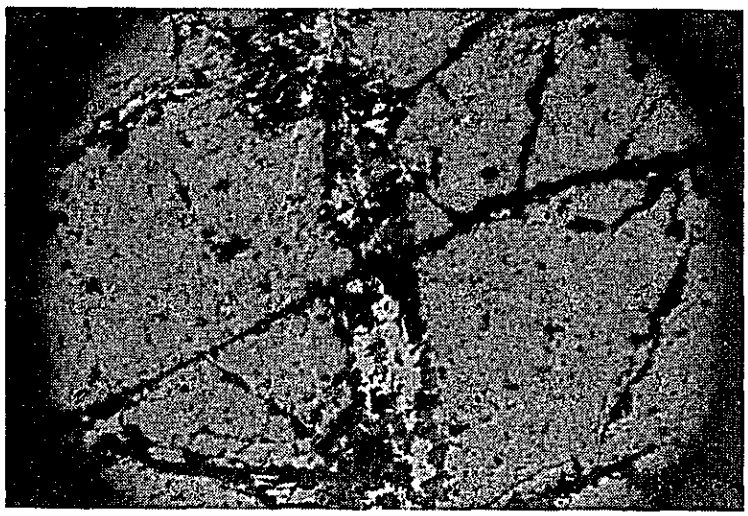
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 20

0 0.1 0.2 mm

1.	Sample No. :	Acr-51
2.	Laboratory No. :	AR - 1125
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, a2, No.2
6.	Coordinates :	21.63N, 05.36E
7.	Location :	Cancıkkomu mine, Taşocağı Tepe, Cancıkkomu, Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular, network
11.	Description of specimen :	Chromite is coarse crystalline and makes aggregates. Grade of the specimen is estimated to be more than 50% Cr_2O_3. Small amount of uvarovite accompanies. Serpentine fills the interstices of chromite.
12.	Microscopy :	Chromite is very coarse grained (more than 4 mm size) and hexahedral or octahedral. It is isotropic and homogeneous and makes aggregates. Fine veinlet of magnetite occurs commonly in chromite. Gangue minerals make mesh structure in chromite.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 7-36 (TA-34) Plate 7-6 (TA-34)

Microscopic observation of polished section



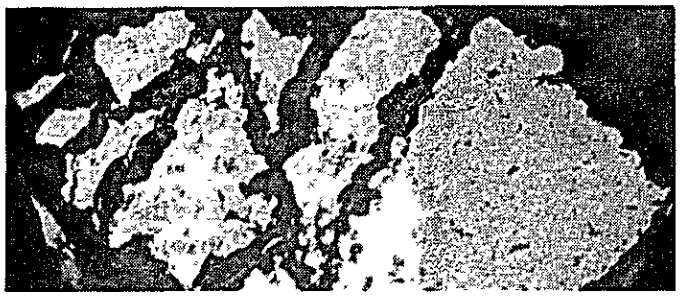
Magnetite veins (center, bright part) in chromite is shown.

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Acr-62
2.	Laboratory No. :	AR - 1127
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, a2, No.3
6.	Coordinates :	15.68N, 05.87E
7.	Location :	Cumakomu, Tercan, Erzincan
8.	Host rock :	serpentinized dunite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	uncertain
11.	Description of specimen :	Chromite is coarse crystalline, compact and makes aggregates. Grade of the specimen is estimated to be 45% Cr_2O_3. Magnetite is found commonly at interstices of chromite. Gangue minerals (powdery serpentine) occur with mesh structure in serpentine.
12.	Microscopy :	Chromite is very coarse grained (more than 4 mm size) and hexahedral or octahedral. It is mostly homogeneous and isotropic. Magnetite is found commonly. It dots in chromite and makes veinlets which cut the chromite crystals. Grain size varies from coarse to very fine. Gangue minerals fill the interstices of chromite crystals.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 7-217 (TY-37) Plate 7-7 (TY-37)

Microscopic observation of polished section

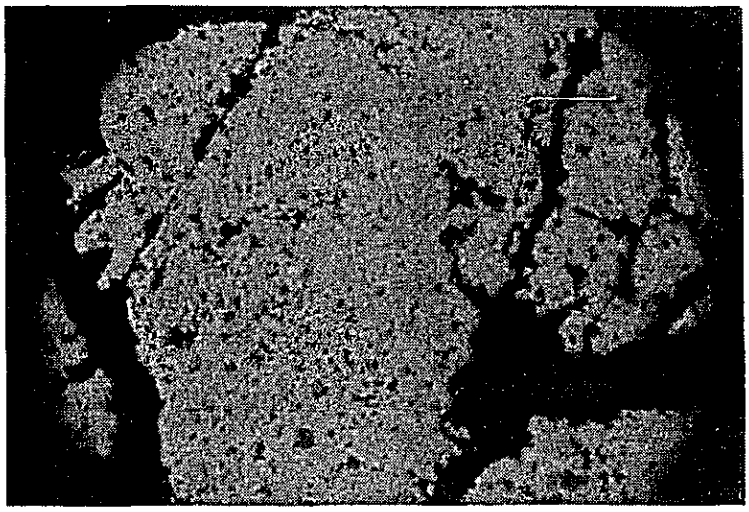


Banding of nodule chromite is shown
upper ← banding plane
lower
Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Acr-80
2.	Laboratory No. :	AR - 1131
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Tortum, H-45, d4, No.4
6.	Coordinates :	32.90N, 31.91E
7.	Location :	Orta Tepe, Dencik, Aşkale, Erzurum
8.	Host rock :	dunite
9.	Name of specimen :	nodule ore
10.	Occurrence :	layered
11.	Description of specimen :	Chromite has nodule shape suggesting sedimentary origin. It is round, very coarse grained (up to 1.2 cm size). Grade of the specimen is estimated approximately 25% Cr_2O_3. Gangue minerals (serpentine) fill the interstices of chromite.
12.	Microscopy :	Chromite nodule shows banded structure. Chromite is round, coarse crystalline, and makes aggregates. It is isotropic and homogeneous. Grain size is more than 1 mm. Gangue minerals make networks and irregular patches in chromite.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 7-44 (TA-42), Appendix 3-13 Plate 7-7 (TA-42)

Microscopic observation of polished section

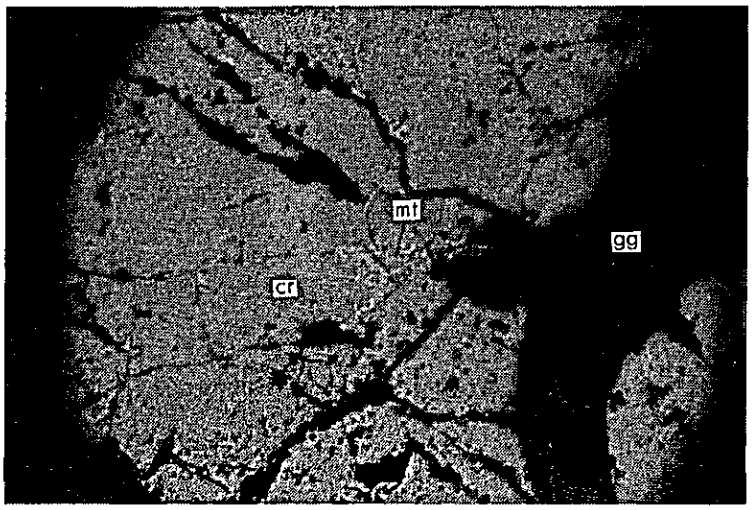


Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Acr-86
2.	Laboratory No. :	AR - 1130
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzurum, i-45, a1, No.1
6.	Coordinates :	78.73 N, 33.62 E
7.	Location :	Kurudere, Pırnakapan, Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is coarse crystalline (0.4 cm) and makes aggregates. Uvarovite accompanies with it. Grade of the specimen is estimated to be approximately 40 % Cr_2O_3. Creamy white-green colored serpentine fills the interstices of chromite.
12.	Microscopy :	Chromite is coarse grained (more than 4 mm size) and octahedral or hexahedral. It is isotropic, homogeneous and makes aggregates. Gangue minerals make veins, and irregular patches in chromite.
13.	Remarks :	refer Appendix 3-15, Appendix 7-52 (TA-50) Plate 7-8 (TA-50)

Microscopic observation of polished section



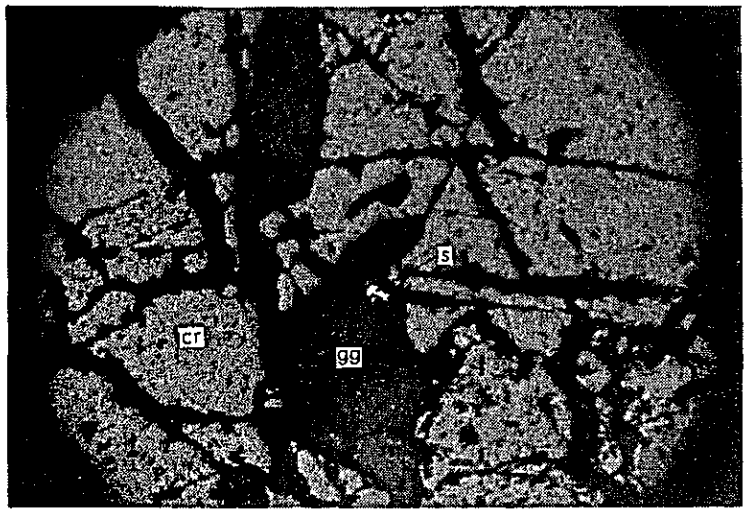
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-2
2.	Laboratory No. :	AR - 1119
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.09 N, 07.64 E
7.	Location :	Sulu ocak, Güllünündere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is equidimensional, medium crystalline (0.3 cm) and makes aggregates. Grade of the specimen is 47.22 % Cr_2O_3. Creamy white colored serpentinite and magnesite makes mesh structure.
12.	Microscopy :	Chromite is mostly subround octahedral or hexahedral with 3 - 4 mm size. It is isotropic, homogeneous and makes aggregates. Magnetite of very fine size (0.01 mm) occurs commonly. It is included in chromite with irregular-shaped crystals. Gangue minerals are found at the interstices of chromite.
13.	Remarks :	refer Appendix 5-5 , Appendix 7-166 (TM-1) Plate 7-3 (TM-1)

Microscopic observation of polished section



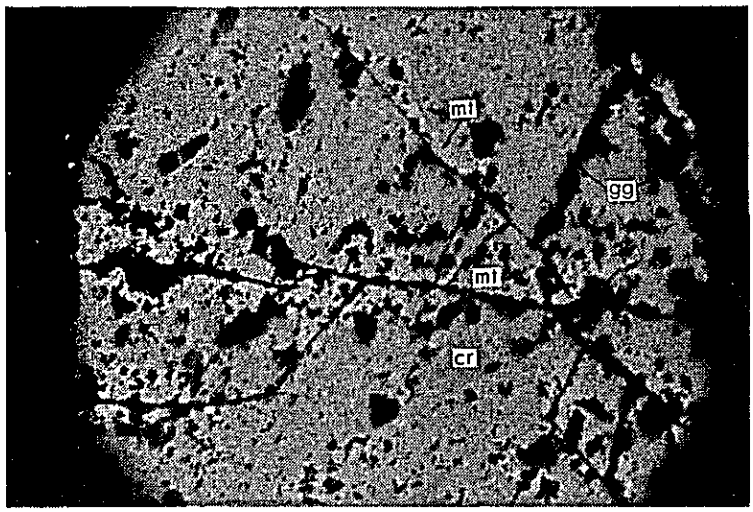
cr : chromite
s : sulfide (pyrite)
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-7
2.	Laboratory No. :	AR - 1123
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.32N, 09.09E
7.	Location :	Çalazarlarındere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive - brecciated ore
10.	Occurrence :	lenticular - layered
11.	Description of specimen :	Chromite is subround and brecciated (0.2 cm size). Grade of the specimen is 38.67% Cr_2O_3. Gangue minerals are serpentine.
12.	Microscopy :	Chromite is round, coarse crystalline (2 - 4 mm size) and octahedral or hexahedral. It is isotropic and homogeneous. Very fine grains of sulfide mineral (pyrite) are scattered in gangue minerals. Gangue minerals make round patches and veins in chromite.
13.	Remarks :	refer Appendix 5-6 , Appendix 7-231(SZ-1), Appendix 4-19 Plate 7-3 (SZ-1)

Microscopic observation of polished section



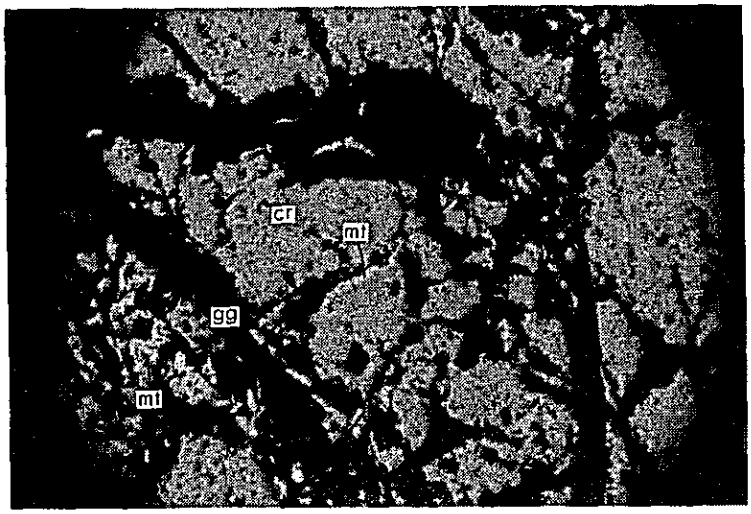
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 20

0 0.1 0.2mm

1.	Sample No. :	Ccr-9
2.	Laboratory No. :	AR - 1120
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.57N, 10.15E
7.	Location :	Gökyokuşun Sr. area, Camplıtepenin Sr., Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is subround and medium crystalline (0.3 cm size). Grade of the specimen is 45.09% Cr_2O_3. Networks of creamy yellowish green colored serpentine are present in chromite.
12.	Microscopy :	Chromite is medium-coarse crystalline (2 mm - more than 4 mm) and octahedral or hexahedral. It is isotropic and makes aggregates. Magnetite is found in abundance. It makes fine patches and veinlets in chromite. Gangue minerals fill the interstices of chromite.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 5-6 , Appendix 7-95 (TC-18) Plate 7-3 (TC-18)

Microscopic observation of polished section



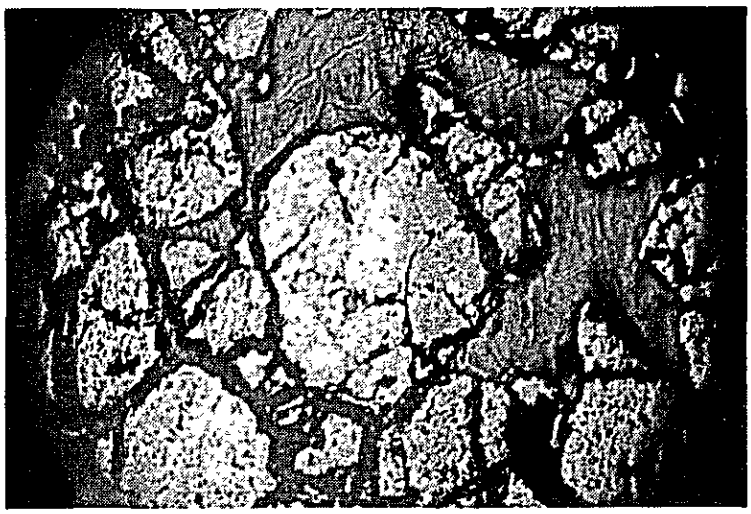
cr : chromite
s : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-21
2.	Laboratory No. :	AR - 1121
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	23.19N, 11.73E
7.	Location :	Çorakdere, Tecer, Aşkale, Erzurum
8.	Host rock :	harzburgite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	uncertain
11.	Description of specimen :	Chromite is round-oval shaped and brecciated. Grain size is 0.2 - 0.8 cm. Grade of the ore is 55.90% Cr_2O_3. Small amount of serpentine fills the interstices of chromite.
12.	Microscopy :	Chromite is round-tabular and coarse crystalline (more than 4 mm). It shows octahedral shape in part. It is brecciated commonly and makes aggregates. Magnetite is found in abundance. It coexist with chromite as small fragments (0.1 - 0.2 mm size) or it makes veins in chromite. Gangue minerals show mesh structure in chromite.
13.	Remarks :	refer Appendix 5-7

Microscopic observation of polished section



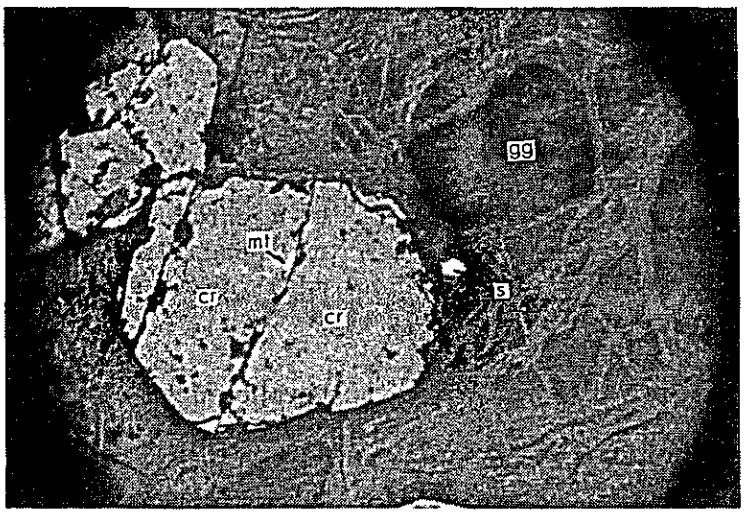
Chromite (light part) and gangue mineral (dard part) are shown.

Paraliel nicol × 4

0 0.75 1.5 mm

1.	Sample No. :	Ccr-22
2.	Laboratory No. :	AR - 1124
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	24.06N, 12.05E
7.	Location :	Çorakdere, Tecer, Aşkale, Erzurum
8.	Host rock :	serpentinized dunite
9.	Name of specimen :	disseminated ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is subround and fine grained (less than 2 mm). Grade of the specimen is 43.41% Cr_2O_3. Gangue minerals are creamy white colored powdery serpentine and black colored fine olivine?, which fill interstices of chromite.
12.	Microscopy :	Chromite is equidimensional and hexahedral or octahedral with 2 mm size. It is isotropic and homogeneous. Gangue minerals are commonly found in chromite as aggregates and veinlets.
13.	Remarks :	refer Appendix 5-7, Appendix 7-106 (TC-29) Plate 7-9 (TC-29)

Microscopic observation of polished section



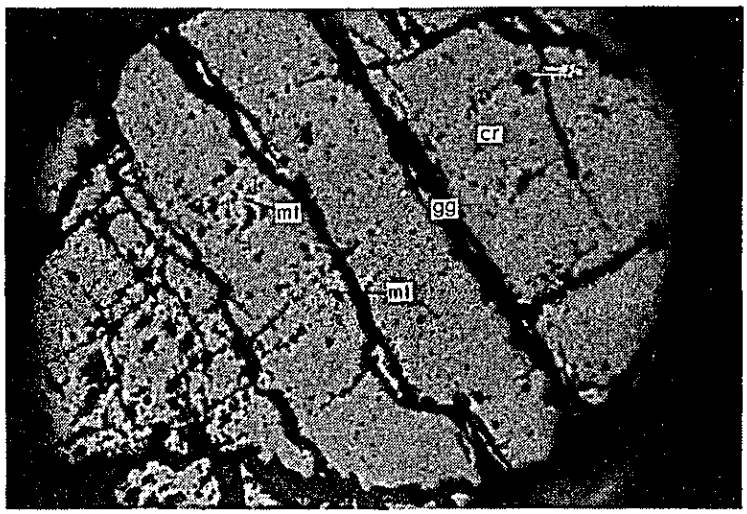
cr : chromite
mt : magnetite
s : sulfide (pyrite)
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-26
2.	Laboratory No. :	AR - 1122
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Trabzon, H-44, c3, No.4
6.	Coordinates :	30.32N, 21.89E
7.	Location :	Fetteninyurdu Sr., Kop, Bayburt, Gümüşhane
8.	Host rock :	serpentinized dunite
9.	Name of specimen :	brecciated ore
10.	Occurrence :	uncertain
11.	Description of specimen :	Chromite is very coarse crystalline (more than 1 cm size) and makes aggregates. Grade of the specimen is 45.11% Cr_2O_3. Uvarovite veinlets are found in chromite and gangue minerals. Gangue mineral (serpentine) fills the interstices of chromite.
12.	Microscopy :	Chromite is very coarse crystalline (more than 4 mm size) and octahedral or hexahedral. It is isotropic and homogeneous. Magnetite is commonly found. It occurs in chromite as very fine (less than 0.05 mm size) irregular-shaped crystals. Gangue minerals show mesh structure in chromite. It includes very small amount of fine sulfide minerals (pyrite).
13.	Remarks :	refer Appendix 5-8 , Appendix 7-118(TC-41)

Microscopic observation of polished section



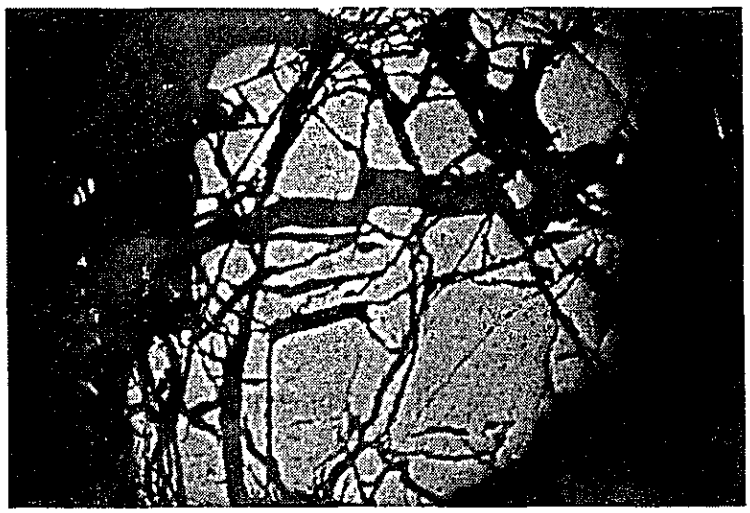
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-33
2.	Laboratory No. :	AR - 1155
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	26.01N, 06.92E
7.	Location :	Tepebaşı mine, Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is coarse crystalline (0.5 cm size) accompanied by uvarovite. Grade of the specimen is estimated to be more than 45% Cr_2O_3. Gangue minerals are powdery serpentine which fill the cracks of chromite.
12.	Microscopy :	Chromite is brecciated and makes aggregates of more than 4 mm size. It is isotropic and homogeneous. Magnetite occurs commonly in chromite. It makes irregular-shaped, fine (0.02 mm size) patches. Gangue minerals show mesh structure in chromite.
13.	Remarks :	refer Appendix 7-78 (TC-2) Plate 7-5 (TC-2)

Microscopic observation of polished section

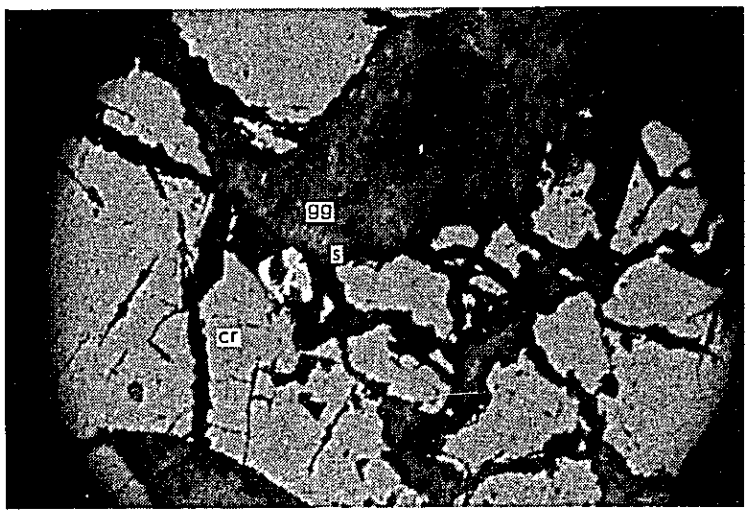


Parallel nicol × 4

0 0.75 1.5 mm

1.	Sample No. :	Ccr-34
2.	Laboratory No. :	AR - 1151
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	26.10 N, 07.02 E
7.	Location :	Tepebaşı mine, Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is coarse grained (1 cm size) and makes aggregates. Grade of the specimen is estimated to be more than 50 % Cr_2O_3. Creamy green colored serpentine and asbestos veinlet are present.
12.	Microscopy :	Chromite is round and coarse crystalline (more than 4 mm size) and makes aggregates. It is isotropic and homogeneous. Very small amount of fine magnetite occurs in chromite. Gangue minerals show mesh structure.
13.	Remarks :	refer Appendix 7-80 (TC-3) Plate 7-5 (TC-3)

Microscopic observation of polished section



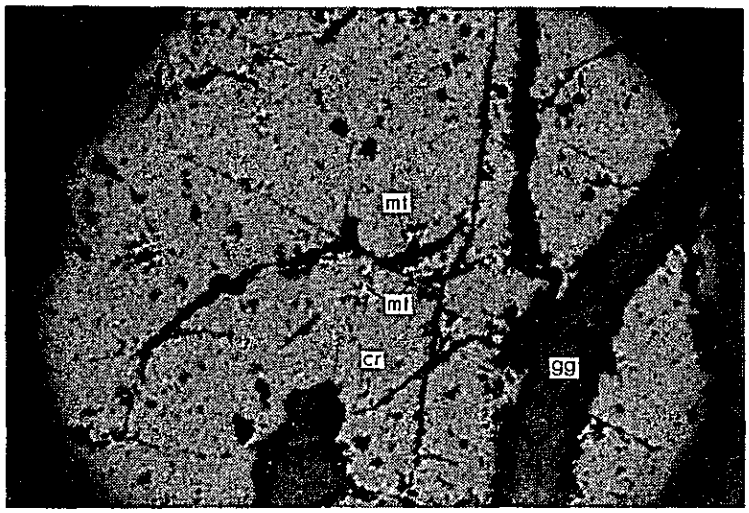
cr : chromite
s : sulfide (pyrite)
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-44
2.	Laboratory No. :	AR - 1153
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.08N, 07.37E
7.	Location :	C Kafa, Güllünündere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is medium grained (0.1 cm size). Grade of the specimen is estimated to be 35 - 40% Cr_2O_3. Serpentine and magnesite show mesh structure.
12.	Microscopy :	Chromite is fine grained (0.1 - 0.2 mm size), and octahedral or hexahedral. Partly it shows brecciated texture. It is isotropic and homogeneous. Small amount of fine sulfide minerals (pyrite, 0.05 mm size) is found commonly in gangue minerals. Gangue minerals make fine networks in chromite.
13.	Remarks :	The specimen is taken from high-grade part of chromite outcrop near trench (TZ-7).

Microscopic observation of polished section



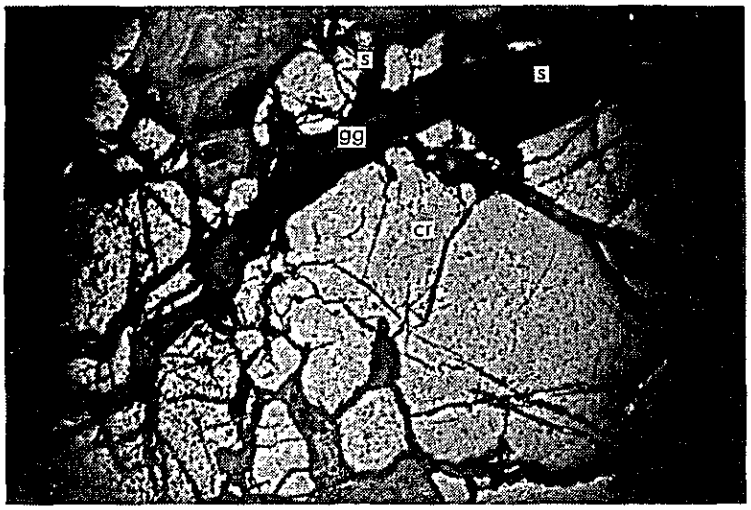
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-47
2.	Laboratory No. :	AR - 1154
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.12 N, 07.74 E
7.	Location :	Sulu mine, Güllünündere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is very coarse crystalline (0.8 mm size) accompanied with uvarovite. Grade of the specimen is estimated to be 45 % Cr_2O_3. Serpentine and magnesite show mesh structure in chromite.
12.	Microscopy :	Chromite is mostly octahedral or hexahedral with 2 - 4 mm size. It shows partly subround or brecciated shape. It is isotropic and homogeneous. Very fine crystals (0.01 mm size) of magnetite are present commonly in chromite. Gangue minerals fill the cracks of chromite.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 7-108 (TC-31)

Microscopic observation of polished section



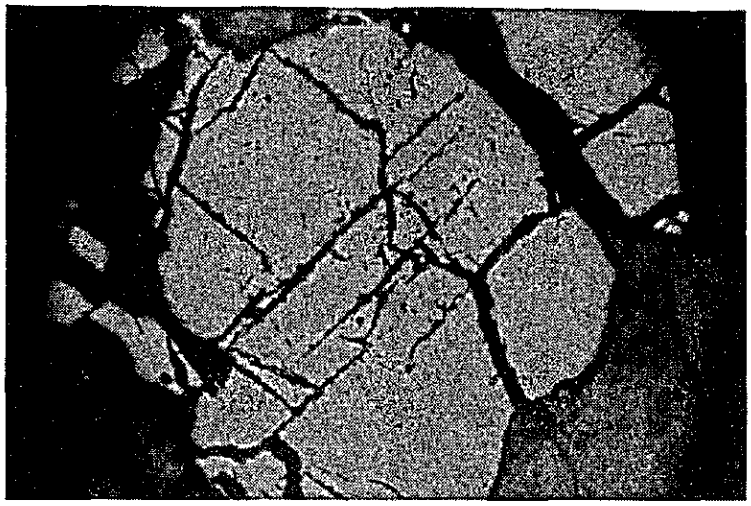
cr : chromite
s : sulfide (pyrite)
gg : gangue mineral

Parallel nicol × 4

0 0.75 1.5 mm

1.	Sample No. :	Ccr-48
2.	Laboratory No. :	AR - 1152
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.16N, 07.69E
7.	Location :	Sulu mine, Güllünündere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive, high-grade ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is coarse-medium crystalline (0.4 cm size). Grade of the specimen is estimated to be 50% Cr_2O_3 approximately. Serpentine and magnesite show mesh structure.
12.	Microscopy :	Chromite is octahedral or hexahedral with 4 mm size. Partly it is subround or brecciated. It is isotropic and homogeneous. Very small amount of fine, irregular-shaped crystals (0.1 mm size) of magnetite is found in chromite. Fine euhedral or subhedral crystals (0.03 - 0.05 mm size) of sulfide minerals (pyrite) are present in gangue minerals. Gangue minerals fill the cracks and interstices of chromite crystals.
13.	Remarks :	The specimen is taken from the outcrop near the adit (GC-2). refer Appendix 7-238

Microscopic observation of polished section

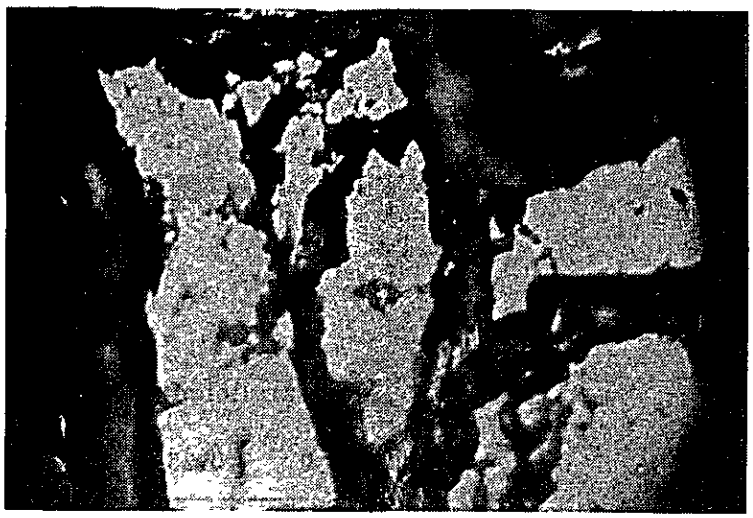


Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Ccr-50
2.	Laboratory No. :	AR - 1150
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.1
6.	Coordinates :	27.32N, 09.09E
7.	Location :	Çalazarlarındere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	banded ore
10.	Occurrence :	layered
11.	Description of specimen :	Chromite is subround and equidimensionally granular with 0.2 cm size. It is accompanied with uvarovite. Grade of the specimen is estimated to be 35 - 40 % Cr_2O_3. Serpentine is present.
12.	Microscopy :	Chromite is round, fine granular (0.1 - 0.2 mm size) and makes aggregates. It is brecciated in part. Sulfide minerals (pyrite) with fine, irregular-shaped crystal (0.01 - 0.02 mm) are found in gangue minerals. Gangue minerals fill the interstices of chromite crystals and occur as veinlet.
13.	Remarks :	refer Appendix 7-231(SZ-1), Appendix 4-9 Plate 7-3 (SZ-1)

Microscopic observation of polished section

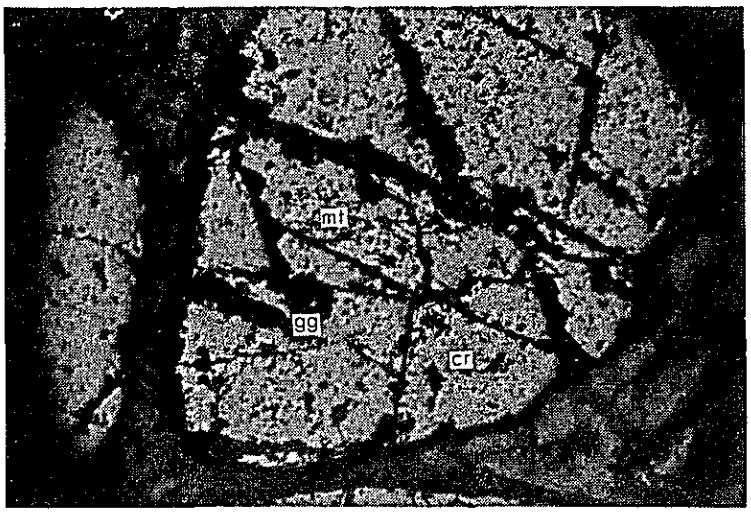


Parallel nicol × 20

0 0.1 0.2 mm

1.	Sample No. :	Dcr-4
2.	Laboratory No. :	AR - 1118
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	28.16 N, 16.68 E
7.	Location :	Batı Coşan mine, Bendindere, Sıçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinized dunite
9.	Name of specimen :	disseminated ore
10.	Occurrence :	lenticalar
11.	Description of specimen :	Chromite is medium crystalline aggregates (0.4 cm size). Grade of the specimen is 27.22 % Cr_2O_3. Powdery serpentine and magnesite are present in abundance.
12.	Microscopy :	Chromite is hexahedral or octahedral granular with 2 - 4 mm size. It is isotropic and homogeneous. Magnetite occurs commonly at the rims of chromite crystals. It is fine grained (0.05 mm size) and irregular in shape. Gangue minerals show mesh structure.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 5-9 , Appendix 7-141 (TD-22) Plate 7-1 (TD-22)

Microscopic observation of polished section



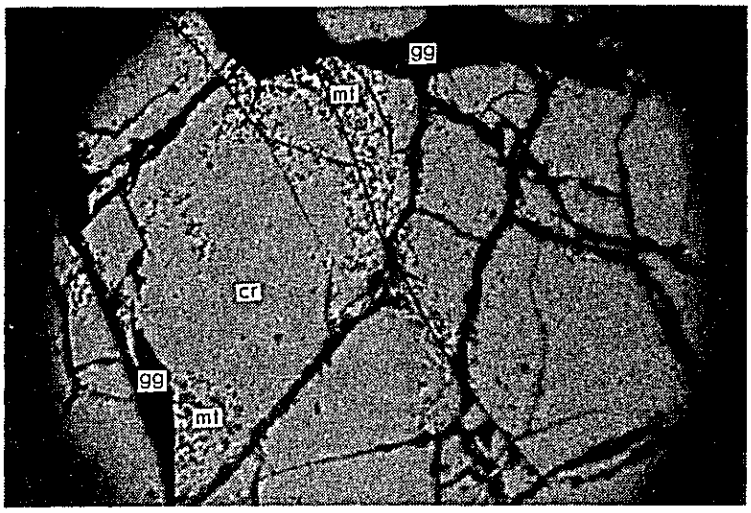
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Dcr-6
2.	Laboratory No. :	AR - 1117
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Trabzon, H-44, c-3, No.4
6.	Coordinates :	30.25 N, 18.81 E
7.	Location :	Coşan mine, Iskınlığındere, Kop, Bayburt, Gümüşhane
8.	Host rock :	serpentinized dunite
9.	Name of specimen :	massive ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is subround, fine (0.2 cm size) and makes aggregates. Grade of the specimen is 37.59% Cr_2O_3. Gangue minerals are serpentinized olivine which occur at the interstices of chromite.
12.	Microscopy :	Chromite is hexahedral or octahedral and fine grained (0.5 - 2 mm). It is isotropic and homogeneous. Small irregular-shaped magnetite occurs abundantly in chromite. Gangue minerals show mesh structure.
13.	Remarks :	The specimen is taken from the stock of ore. refer Appendix 5-10, Appendix 7-152(TD-33) Plate 7-1 (TD-33)

Microscopic observation of polished section



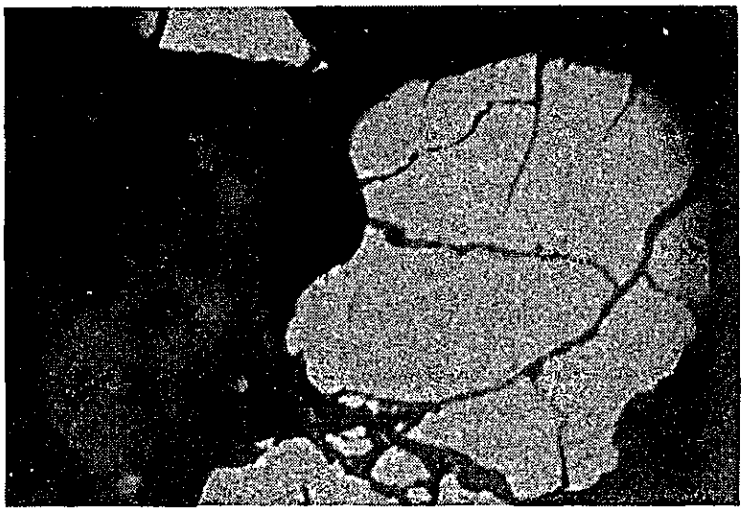
cr : chromite
mt : magnetite
gg : gangue mineral

Parallel nicol × 10

0 0.25 0.5 mm

1.	Sample No. :	Dcr-14
2.	Laboratory No. :	AR - 1148
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Trabzon, H-44, c3, No.4
6.	Coordinates :	30.05 N, 18.73 E
7.	Location :	Coşan mine, Iskınlığındere, Kop, Bayburt, Gümüşhane
8.	Host rock :	serpentinized dunite
9.	Name of specimen :	disseminated ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is medium-grained (0.1 - 0.3 cm) and makes aggregates. Grade of the specimen is estimated to be 33 % Cr_2O_3 approximately. Creamy white colored serpentine shows mesh structure.
12.	Microscopy :	Chromite is round, hexahedral or octahedral with 0.1 - 0.2 mm size. It is isotropic and homogeneous. Fine grained (0.03 mm), irregular-shaped magnetite is found in chromite. It is abundant at the rim of the chromite and along the cracks of chromite. Very small amount of sulfide minerals (pyrite) with 0.2 mm size is included in the gangue minerals. Gangue minerals fill the interstices and cracks of chromite crystals and occur as veinlets.
13.	Remarks :	refer Appendix 7-150(TD-31), Plate 7-1 (TD-31)

Microscopic observation of polished section



Parallel nicol × 20

0 0.1 0.2 mm

1.	Sample No. :	Dcr-15
2.	Laboratory No. :	AR - 1149
3.	Project No. :	78/26
4.	Area :	Kopdağ
5.	Map No. :	Erzincan, i-44, b1, No.2
6.	Coordinates :	28.07N, 16.50E
7.	Location :	Batı Coşan mine, Bendindere, Siçankale Y., Aşkale, Erzurum
8.	Host rock :	serpentinite
9.	Name of specimen :	massive - brecciated ore
10.	Occurrence :	lenticular
11.	Description of specimen :	Chromite is round, brecciated and coarse crystalline (0.5 cm size). It is accompanied with uvarovite. Grade of the specimen is estimated to be 35 -40% Cr_2O_3. Creamy green colored, powdery serpentine is observed.
12.	Microscopy :	Chromite is round and coarse grained. (more than 4 mm size) It is isotropic and homogeneous. Small amount of fine grained magnetite is in cluded in it. Gangue minerals show mesh structure.
13.	Remarks :	refer Appendix 7-136(TD-17) Plate 7-1 (TD-17)

APPENDIX 5

List of chemical analyses of ore

Synthesized list of chemical analysis of ore.

No.	Map No.	Location	Name of mine	Trench No.	Host rock	Type of sample	Location of sample	Method of sampling	Width (m)	Results of chemical analysis %					Cr/Fe	Cr/Al
										Cr_2O_3	Al_2O_3	FeO	MgO	SiO_2		
Acr-3	EZN I44, A-2, No.2	Kırıcakdere, AŞK., EZR.	Civelek	TA-18	S	lenticular massive brecciated	trench	random	0.7	35.87	8.78	13.39	23.52	13.12	2.36	5.28
Acr-9	EZN I44, A-2, No.2	Keşan Tepe, AŞK., EZR.	Pembe Gül	TA-15	Powdery S	lenticular massive disseminated	trench	line-cutting	0.55	40.35	9.02	12.89	22.01	11.76	2.76	5.78
Acr-13	EZN I44, A-2, No.2	Baltadeğmez Sr., AŞK., EZR.	Dikyokuş	TA-10	S	layered net-work massive	trench	random	0.90	19.49	8.07	12.17	29.72	19.89	1.41	3.12
Bcr-1	EZN I44, A-2, No.2	Kırıcakdere, AŞK., EZR.	Civelek	TB-1	SDu	massive brecciated	stock	random	----	30.65	8.71	13.03	27.46	13.38	2.07	4.55
Bcr-4	EZN I44, A-2, No.2	Keşan Tepe AŞK. EZR	Pembe Gül	TM-3	Powdery S	layered massive	stock	random	----	27.53	8.28	10.74	31.10	14.86	2.26	4.30
Bcr-9	EZN I44, A-2, No.3	Fındıkdere, AŞK., EZR.	Kara Tepe	TB-11	SDu	massive	stock	high-grade part	----	52.53	13.12	12.82	17.01	4.62	3.61	5.18
Bcr-11	Tortum H45, D-4, No.3	Körüsmân Tepe, AŞK., EZR.	Körüsmân Tepe	TB-20	SDu	massive disseminated	stock	random	----	31.96	19.21	15.54	18.76	7.02	1.81	2.15
Ccr-2	EZN I-44, B-1, No.1	Güllunündere, AŞK., EZR.	Sulu	TM-1	S	lenticular massive	trench	high-grade part	uncertain	47.22	13.98	16.65	17.06	4.78	2.50	4.37
Ccr-7	EZN I44, B-1, No.1	Çalazarlarındere, AŞK., EZR.	Çalazarlarındere	SZ-1	S	layered lenticular massive brecciated	outcrop	random	uncertain	38.67	11.18	14.25	22.37	10.72	2.39	4.47
Ccr-9	EZN I44, B-1, No.1	Camplıtepenin Sr., AŞK., EZR.	Gokyokuşun Sr.	TC-18	S	lenticular massive	stock	high-grade part	----	45.09	10.24	19.48	16.35	7.14	2.04	5.69
Ccr-21	EZN I44, B-1, No.1	Çorakdere, AŞK., EZR.	Tecer	----	Hrz	massive	outcrop	high-grade part	uncertain	55.90	13.76	14.32	15.38	1.2	3.44	5.25
Ccr-22	EZN I44, B-1, No.1	Çorakdere, AŞK., EZR.	Tecer	TC-29	SDu	lenticular disseminated	trench	high-grade part	uncertain	43.41	10.21	15.54	18.87	10.24	2.46	5.50
Ccr-26	TBZ H44, C-3, No.4	Fattenlıyurdu Sr., BAY., Gumüşhane	Arapçayırıdere	TC-41	SDu	massive brecciated	trench	high-grade part	uncertain	45.11	13.84	15.54	17.43	7.74	2.56	4.21
Ccr-29	TBZ H44, C-3, No.4	Iskınlığındere, BAY., Gümüşhane	Coşan	TC-30	SDu	layered massive	trench	random	uncertain	39.78	8.92	17.83	21.30	8.28	1.96	5.77
Dcr-1	EZN I44, B-1, No.2	Catınardınındere, AŞK., EZR.	Sıçankale	TD-13	SDu	lenticular brecciated massive	stock	random	----	32.24	10.19	15.68	22.76	14.72	1.81	4.09
Dcr-4	BZN I44, B-1, No.2	Bendin dere, AŞK., EZR.	Batı Coşan	TD-22	SDu	lenticular massive brecciated	stock	random	----	27.22	8.68	12.39	28.75	12.90	1.93	4.05
Dcr-6	TBZ H44, C-3, No.4	Iskınlığındere, BAY., Gumüşhane	Coşan	TD-33	SDu	lenticular massive	stock	random	----	37.59	9.54	15.65	22.38	11.37	2.11	5.09
Zcr-6	EZN I44, B-1, No.1	Büyükgullunun Sr., AŞK., EZR.	Batı Ezan	TZ-1	Powdery S	layered massive disseminated	stock	random	----	38.29	11.45	14.11	22.35	10.24	2.39	4.32

Abbreviations

EZN : Erzincan
EZR : Erzurum
TBZ : Trabzon
AŞK : Aşkale
BAY : Bayburt

S : Serpentinite
SDu : Serpentinized dunite
Du : Dunite
Hrz : Harzburgite

List of chemical analysis of ore

1.	Sample No. :	Acr-3				
2.	Project No. :	78/26				
3.	Area :	Kopdağ				
4.	Map No. :	Erzincan, i-44, a2, No.2				
5.	Coordinates :	26.25N, 06.50E				
6.	Location :	Kırıcakdere, Sıçankale Y., Aşkale, Erzurum.				
7.	Name of the mine or area :	Civelek				
8.	Trench or adit related :	TA-18				
9.	Host rock :	serpentinite				
10.	Shape of orebody :	lenticular				
11.	Type of ore :	massive, brecciated				
12.	Place where sample is taken :	trench				
13.	Method of sampling :	random sampling				
14.	Width of Sampling :	0.70 m				
	Width of orebody :	> 0.70m				
15.	Analytical value :	Cr_2O_3	35.87 %	MgO	23.52 %	
		Al_2O_3	8.78 %	SiO_2	13.12 %	
		FeO	13.39 %			
16.	Metallic ratio :	Cr/Fe	2.36			
		Cr/Al	5.28			
17.	Remarks :	refer	Appendix 7-18			
			Plate 7-5			

1.	Sample No. :	Acr-9				
2.	Project No. :	78/26				
3.	Area :	Kopdağ				
4.	Map No. :	Erzincan, i-44, a2, No.2				
5.	Coordinates :	24.40N, 05.21E.				
6.	Location :	Keşan Tepe, Cancıkkomu, Aşkale, Erzurum.				
7.	Name of the mine or area :	Pembe Gül				
8.	Trench or adit related :	TA-15				
9.	Host rock :	powdery serpentinite				
10.	Shape of orebody :	lenticular				
11.	Type of ore :	massive, disseminated				
12.	Place where sample is taken :	trench				
13.	Method of sampling :	line-cutting sampling				
14.	Width of sampling :	0.55 m				
	Width of orebody :	> 0.55 m				
15.	Analytical value :	Cr_2O_3	40.35 %	MgO	22.01 %	
		Al_2O_3	9.02 %	SiO_2	11.76 %	
		FeO	12.89 %			
16.	Metallic ratio :	Cr/Fe	2.76			
		Cr/Al	5.78			
17.	Remarks :	refer	Appendix 7-15			
			Plate 7-5			

List of chemical analysis of ore

1.	Sample No. :	Acr-13			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, a2, No.2			
5.	Coordinates :	23.78N, 04.44E.			
6.	Location :	Baltadeğmez Sr., Cancıkkomu, Aşkale, Erzurum.			
7.	Name of the mine or area :	Dikyokuş			
8.	Trench or adit related :	TA-10			
9.	Host rock :	serpentinite			
10.	Shape of orebody :	layered, network			
11.	Type of ore :	massive, disseminated			
12.	Place where sample is taken :	trench			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	0.90 m			
	Width of orebody :	>0.90 m (width of unit layer is 3 - 15 cm)			
15.	Analytical value :	Cr_2O_3	19.49 %	MgO	29.72 %
		Al_2O_3	8.07 %	SiO_2	19.89 %
		FeO	12.17 %		
16.	Metallic ratio :	Cr/Fe	1.41		
		Cr/Al	3.12		
17.	Remarks :	refer	Appendix 7-10		
			Plate 7-6		

This specimen includes large amount of host rocks.

1.	Sample No. :	Bcr-1			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, a2, No.2			
5.	Coordinates :	26.24N, 06.40E			
6.	Location :	Kırıcakdere, Sıçankale Y., Aşkale, Erzurum.			
7.	Name of the mine or area :	Civelek			
8.	Trench or adit related :	TB-1			
9.	Host rock :	strongly serpentinized dunite			
10.	Shape of orebody :	uncertain			
11.	Type of ore :	massive, brecciated			
12.	Place where sample is taken :	stock of ore			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	-----			
	Width of orebody :	uncertain			
15.	Analytical value :	Cr_2O_3	30.65 %	MgO	27.46 %
		Al_2O_3	8.71 %	SiO_2	13.38 %
		FeO	13.03 %		
16.	Metallic ratio :	Cr/Fe	2.07		
		Cr/Al	4.55		
17.	Remarks :	refer	Appendix 7-55		
			Plate 7-5		

List of chemical analysis of ore

1.	Sample No. :	Bcr-4			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, a2, No.2			
5.	Coordinates :	24.30 N, 5.05 E.			
6.	Location :	Keşandere, Cancıkkomu, Aşkale, Erzurum.			
7.	Name of the mine or area :	Pembe Gül			
8.	Trench or adit related :	TM-3			
9.	Host rock :	powdery serpentinite			
10.	Shape of orebody :	layered			
11.	Type of ore :	massive			
12.	Place where sample is taken :	stock of ore			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	-----			
	Width of orebody :	1.00 m			
15.	Analytical value :	Cr_2O_3	27.53 %	MgO	31.10 %
		Al_2O_3	8.28 %	SiO_2	14.86 %
		FeO	10.74 %		
16.	Metallic ratio :	Cr/Fe	2.26		
		Cr/Al	4.39		
17.	Remarks :	refer	Appendix 7-168		
			Plate 7-5		

1.	Sample No. :	Bcr-9			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, a2, No.3			
5.	Coordinates :	20.64 N, 04.76 E.			
6.	Location :	Fındıkdere, Cancıkkomu, Aşkale, Erzurum.			
7.	Name of the mine or area :	Kara Tepe			
8.	Trench or adit related :	TB-11			
9.	Host rock :	serpentinized dunite			
10.	Shape of orebody :	uncertain			
11.	Type of ore :	massive			
12.	Place where sample is taken :	stock of ore			
13.	Method of sampling :	gravel sample of high-grade part			
14.	Width of sampling :	-----			
	Width of orebody :	uncertain			
15.	Analytical value :	Cr_2O_3	52.53 %	MgO	17.01 %
		Al_2O_3	13.12 %	SiO_2	4.62 %
		FeO	12.82 %		
16.	Metallic ratio :	Cr/Fe	3.61		
		Cr/Al	5.18		
17.	Remarks :	refer	Appendix 7-65		
			Plate 7-6		

List of chemical analysis of ore

1.	Sample No. :	Bcr-111			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Tortum, H-45, d4, No.3			
5.	Coordinates :	33.10 N, 34.30 E.			
6.	Location :	Körösmân Tepe, Dencik, Aşkale, Erzurum			
7.	Name of the mine or area :	Körösmân Tepe			
8.	Trench or adit related :	TB-20			
9.	Host rock :	serpentinized dunite			
10.	Shape of orebody :	lenticular			
11.	Type of ore :	massive, disseminated			
12.	Place where sample is taken :	stock of ore			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	-----			
	Width of orebody :	uncertain			
15.	Analytical value :	Cr_2O_3	31.96 %	MgO	18.76 %
		Al_2O_3	19.21 %	SiO_2	7.02 %
		FeO	15.54 %		
16.	Metallic ratio :	Cr/Fe	1.81		
		Cr/Al	2.15		
17.	Remarks :	refer	Appendix 7-74		
			Plate 7-7		

1.	Sample No. :	Ccr-2			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, b1, No.1			
5.	Coordinates :	27.09 N, 07.64 E.			
6.	Location :	Güllünündere, Sıçankale Y., Aşkale, Erzurum			
7.	Name of the mine or area :	Sulu			
8.	Trench or adit related :	TM-1			
9.	Host rock :	serpentinite			
10.	Shape of orebody :	lenticular			
11.	Type of ore :	massive			
12.	Place where sample is taken :	trench			
13.	Method of sampling	gravel sample of high-grade part			
14.	Width of sampling :	uncertain			
	Width of orebody :	approximately 4.00 m			
15.	Analytical value :	Cr_2O_3	47.22 %	MgO	17.06 %
		Al_2O_3	13.98 %	SiO_2	4.78 %
		FeO	16.65 %		
16.	Metallic ratio :	Cr/Fe	2.50		
		Cr/Al	4.37		
17.	Remarks :	refer	Appendix 4-8 , Appendix 7-166		
			Plate 7-3		

List of chemical analysis of ore

1.	Sample No. :	Ccr-7				
2.	Project No. :	78/26				
3.	Area :	Kopdağ				
4.	Map No. :	Erzincan, i-44, b1, No.1				
5.	Coordinates :	27.32N, 09.09E.				
6.	Location :	Çalazarlarındere, Sıçankale Y., Aşkale, Erzurum				
7.	Name of the mine or area :	Çalazarlarındere				
8.	Trench or adit related :	SZ-1				
9.	Host rock :	serpentinite				
10.	Shape of orebody :	layered, lenticular				
11.	Type of ore :	massive, brecciated				
12.	Place where sample is taken :	outcrop				
13.	Method of sampling :	random sampling				
14.	Width of sampling :	uncertain				
	Width of orebody :	1.50 m				
15.	Analytical value :	Cr_2O_3	38.67 %	MgO	22.37 %	
		Al_2O_3	11.18 %	SiO_2	10.72 %	
		FeO	14.25 %			
16.	Metallic ratio :	Cr/Fe	2.39			
		Cr/Al	4.47			
17.	Remarks :	refer	Appendix 4-9 , Appendix 7-231			
			Plate 7-3			

1.	Sample No. :	Ccr-9				
2.	Project No. :	78/26				
3.	Area :	Kopdağ				
4.	Map No. :	Erzincan, i-44, b1, No.1				
5.	Coordinates :	27.57N, 10.15E.				
6.	Location :	Camplıtepenin Sr, Sıçankale Y., Aşkale, Erzurum				
7.	Name of the mine or area :	Gökyokuşun Sr.				
8.	Trench or adit related :	TC-18				
9.	Host rock :	serpentinite				
10.	Shape of orebody :	lenticular				
11.	Type of ore :	massive				
12.	Place where sample is taken :	stock of ore				
13.	Method of sampling :	random sample of high-grade part				
14.	Width of sampling :	-----				
	Width of orebody :	1.20 m				
15.	Analytical value :	Cr_2O_3	45.09 %	MgO	16.35 %	
		Al_2O_3	10.24 %	SiO_2	7.14 %	
		FeO	19.48 %			
16.	Metallic ratio :	Cr/Fe	2.04			
		Cr/Al	5.69			
17.	Remarks :	refer	Appendix 4-10 , Appendix 7-95			
			Plate 7-3			

List of chemical analysis of ore

1.	Sample No. :	Ccr-21			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, b1, No.1			
5.	Coordinates :	23.19N, 11.73E.			
6.	Location :	Çorakdere, Tecer, Aşkale, Erzurum			
7.	Name of the mine or area :	Tecer			
8.	Trench or adit related :	-----			
9.	Host rock :	harzburgite			
10.	Shape of orebody :	uncertain			
11.	Type of ore :	massive			
12.	Place where sample is taken :	outcrop			
13.	Method of sampling :	gravel sample of high-grade part			
14.	Width of sampling :	uncertain			
	Width of orebody :	uncertain			
15.	Analytical value :	Cr_2O_3	55.90 %	MgO	15.58 %
		Al_2O_3	13.76 %	SiO_2	1.2 %
		FeO	14.32 %		
16.	Metallic ratio :	Cr/Fe	3.44		
		Cr/Al	5.25		
17.	Remarks :	refer	Appendix 4-11		

1.	Sample No. :	Ccr-22			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, b1, No.1			
5.	Coordinates :	24.06N, 12.05E.			
6.	Location :	Çorakdere, Tecer, Aşkale, Erzurum			
7.	Name of the mine or area :	Tecer			
8.	Trench or adit related :	TC-29			
9.	Host rock :	serpentinized dunite			
10.	Shape of orebody :	lenticular			
11.	Type of ore :	disseminated, massive			
12.	Place where sample is taken :	trench			
13.	Method of sampling :	gravel sample of high-grade part			
14.	Width of sampling :	uncertain			
	Width of orebody :	0.40 m (maximum), 6 unit ore bodies have approximately 1 m width.			
15.	Analytical value :	Cr_2O_3	43.41 %	MgO	18.87 %
		Al_2O_3	10.21 %	SiO_2	10.24 %
		FeO	15.54 %		
16.	Metallic ratio :	Cr/Fe	2.46		
		Cr/Al	5.50		
17.	Remarks :	refer	Appendix 4-12 , Appendix 7-106 Plate 7-9		

List of chemical analysis of ore

1.	Sample No. :	Ccr-26			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Trabzon, H-44, c3, No.4			
5.	Coordinates :	30.32 N, 21.89 E.			
6.	Location :	Fatteninyurdu Sr., Kop, Bayburt, Gümüşhane			
7.	Name of the mine or area :	Arapçayırıdere			
8.	Trenach or adit related :	TC-41			
9.	Host rock :	serpentinized dunite			
10.	Shape of orebody :	uncertain			
11.	Type of ore :	massive, brecciated			
12.	Place where sample is taken :	trench			
13.	Method of sampling :	gravel sample of high-grade part			
14.	Width of sampling :	uncertain			
	Width of orebody :	0.50 m			
15.	Analytical value :	Cr_2O_3	45.11 %	MgO	17.43 %
		Al_2O_3	13.84 %	SiO_2	7.74 %
		FeO	15.54 %		
16.	Metallic ratio :	Cr/Fe	2.56		
		Cr/Al	4.21		
17.	Remarks :	refer Appendix 4-13, Appendix 7-118			
	uvarovite accompanies				

1.	Sample No. :	Ccr-29			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Trabzon, H-44, c3, No.4			
5.	Coordinates :	30.55 N, 18.99 E.			
6.	Location :	Iskınlığındere, Kop, Bayburt, Gümüşhane			
7.	Name of the mine or area :	Coşan			
8.	Trench or adit related :	TC-30			
9.	Host rock :	strongly serpentinized dunite			
10.	Shape of orebody :	layered			
11.	Type of ore :	massive			
12.	Place where sample is taken :	trench			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	uncertain			
	Width of orebody :	3.50 m (maximum)			
15.	Analytical value :	Cr_2O_3	39.78 %	MgO	21.30 %
		Al_2O_3	8.92 %	SiO_2	8.28 %
		FeO	17.83 %		
16.	Metallic ratio :	Cr/Fe	1.96		
		Cr/Al	5.77		
17.	Remarks :	refer	Appendix 7-107		
			Plate 7-1		

List of chemical analysis of ore

1.	Sample No. :	Dcr-1				
2.	Project No. :	78/26				
3.	Area :	Kopdağ				
4.	Map No. :	Erzincan, i-44, b1, No.2				
5.	Coordinates :	27.69 N, 14.15 E				
6.	Location :	Catinardınındere, Sıçankale Y., Aşkale, Erzurum				
7.	Name of the mine or area :	Sıçankale				
8.	Trench or adit related :	TD-13				
9.	Host rock :	serpentinized dunite				
10.	Shape of orebody :	lenticular				
11.	Type of ore :	massive, brecciated				
12.	Place where sample is taken :	stock of ore				
13.	Method of sampling :	random sampling				
14.	Width of sampling :	-----				
	Width of orebody :	1.50 m (maximum)				
15.	Analytical value :	Cr_2O_3	32.24 %	MgO	22.76 %	
		Al_2O_3	10.19 %	SiO_2	14.72 %	
		FeO	15.68 %			
16.	Metallic ratio :	Cr/Fe	1.81			
		Cr/Al	4.09			
17.	Remarks :	refer	Appendix 7-132, Appendix 6-12			
			Plate 7-2			

1.	Sample No. :	Dcr-4				
2.	Project No. :	78/26				
3.	Area :	Kopdağ				
4.	Map No. :	Erzincan, i-44, b1, No.2				
5.	Coordinates :	28.16 N, 16.68 E.				
6.	Location :	Bendindere, Sıçankale Y., Aşkale, Erzurum				
7.	Name of the mine or area :	Batı Coşan				
8.	Trench or adit related :	TD-22				
9.	Host rock :	serpentinized dunite				
10.	Shape of orebody :	lenticular				
11.	Type of ore :	massive, disseminated, brecciated				
12.	Place where sample is taken :	stock of ore				
13.	Method of sampling :	random sampling				
14.	Width of sampling :	-----				
	Width of orebody :	1.50 m (maximum)				
15.	Analytical value :	Cr_2O_3	27.22 %	MgO	28.75 %	
		Al_2O_3	8.68 %	SiO_2	12.90 %	
		FeO	12.39 %			
16.	Metallic ratio :	Cr/Fe	1.93			
		Cr/Al	4.05			
17.	Remarks :	refer	Appendix 4-20 , Appendix 7-141			
			Plate 7-1			

List of chemical analysis of ore

1.	Sample No. :	Dcr-6			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Trabzon, H-44, c3, No.4			
5.	Coordinates :	30.25 N, 18.81 E			
6.	Location :	Iskınlığdere, Kop, Bayburt, Gümüşhane			
7.	Name of the mine or area :	Coşan			
8.	Trench or adit related :	TD-33			
9.	Host rock :	serpentinized dunite			
10.	Shape of orebody :	lenticular			
11.	Type of ore :	massive			
12.	Place where sample is taken :	stock of ore			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	-----			
	Width of orebody :	7.00 m (average) or 10.00 m (maximum)			
15.	Analytical value :	Cr_2O_3	37.59 %	MgO	22.38 %
		Al_2O_3	9.54 %	SiO_2	11.37 %
		FeO	15.65 %		
16.	Metallic ratio :	Cr/Fe	2.11		
		Cr/Al	5.09		
17.	Remarks :	refer	Appendix 4-21 , Appendix 7-152		
			Plate 7-1		

1.	Sample No. :	Zcr-6			
2.	Project No. :	78/26			
3.	Area :	Kopdağ			
4.	Map No. :	Erzincan, i-44, b1, No.1			
5.	Coordinates :	26.85 N, 06.75 E.			
6.	Location :	Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum			
7.	Name of the mine or area :	Batı Ezan			
8.	Trench or adit related :	TZ-1			
9.	Host rock :	powdery serpentinite			
10.	Shape of orebody :	layered			
11.	Type of ore :	massive, disseminated			
12.	Place where sample is taken :	stock of ore			
13.	Method of sampling :	random sampling			
14.	Width of sampling :	-----			
	Width of orebody :	7.50 m (maximum)			
15.	Analytical value :	Cr_2O_3	38.29 %	MgO	22.35 %
		Al_2O_3	11.45 %	SiO_2	10.24 %
		FeO	14.11 %		
16.	Metallic ratio :	Cr/Fe	2.39		
		Cr/Al	4.32		
17.	Remarks :	refer	Appendix 7-221		
			Plate 7-4		

Kaemmererite accompanies.

APPENDIX 6

List of X-ray diffractive analyses

Remarks :

Specifications of measurement are ;

tube - filter	:	Cu - Ni
electric current - voltage	:	15 mA - 30 kV
scanning speed	:	2°/min.
time constant	:	2 sec.
slit system	:	1° - 0.3 mm - 1°
recording speed	:	2 cm/min.
full scale	:	1,000 cps.

Synthesized list of X-ray diffractive analysis

Sample No.	Location (Aşk. : Aşkale, Bay : Bayburt)	Sample name	quartz	feldspar	forsterite	enstatite	augite	serpentine	natrolite	calcite	dolomite	magnesite	hydromagnesite	artinite	brucite	stichtite	magnesiochromite	aragonite	Remarks (* refer Appendix 3)
Acr- 4	Civelek, Yayla D., Aşk.	serpentinite						+								±	++		*
A - 21	Kanlıkzey D., Çayırlı	natrolite rock		+					+++										*
A - 49	Cancık komu, Aşk.	lateritic serpentinite						++			+								*
A - 89	Gülabi komu, Aşk.	serpentinized harzburgite						+++											
A - 92	Hasboy komu, Aşk.	natrolite rock		++					++										*
A - 93	Saptıran, Aşk.	" "		+					+++										*
Acr- 97	Baltadeğmez, Aşk.	serpentinite						+									+++		
A -114	Erbaş, Çayırlı	carbonate rock									+++								*
A -121	Baltadeğmez, Aşk.	serpentinite						+					+			+	++		
Bx - 1	Orta Ezan, Aşk.	"						+++								+	++		
Bx - 2	Armutlu, Aşk.	"						++								+	+		
Bx - 3	C Kafa, Aşk.	"						+++					+			++			
B - 60	Uzunçayır Sr., Aşk.	carbonatized serpentinite						±				+++							*
C - 46	Altıntaş Aşk.	carbonate rock									+++	+++							*
Cx - 1	Batı Ezan, Aşk.	serpentinite						+++							++	±	++		
Cx - 2	Tepebaşı, Aşk.	"						+					+++			+	+		
Cx - 3	Sulu, Aşk.	serpentinized dunite						+++							+	±			
Cx - 4	" "	serpentinite						+					+++						
D - 58	Batı Coşan, Aşk.	serpentinite from dunite						+++									+		*
D - 59	Sıçankale, Aşk.	serpentinized dunite						++					++						
D - 60	" "	" "						+									+++	±	
D - 61	" "	harzburgite						+++											
D - 62	Batı Coşan , Aşk.	serpentinized dunite						+++					++						
D - 63	Coşan, Bay.	" "						+++						+++	+++				
X - 12	Dingik, Aşk.	harzburgite			++	+		±											*
X - 14	Batı Coşan, Aşk.	serpentinite from dunite						+++									++		*
X - 15	" " "	clinopyroxenite					++	+											*
X - 18	Sıçankale, Aşk.	serpentinite from harzburgite						+++							+		+		*
X - 21	Çırmıt köyü, Aşk.	altered serpentinite	+++							++	++	+							*
Z - 14	Ağcahisar, Aşk.	dolomite									+++								*

Intensity of X-ray diffracted is shown :

+++	very strong,
++	strong,
+	moderate,
±	weak

List of X-ray diffractive analysis

1. Sample No. : Acr-4
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, a2, No.2
5. Coordinates : 25.84N, 06.40E
6. Location : Civelek, Yayla D., Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of specimen :

This specimen is taken randomly from the orebody in trench (TA-17) at Civelek and is the mixture of powdery serpentinite and coarse chromite ore which is disseminated along fractures of serpentinite. Width of orebody is more than 150 cm.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentinite	moderate
stichtite	weak
magnesiochromite	strong

12. Remarks : refer Appendix 7-17 (TA-17)
Plate 7-5 (TA-17)

1. Sample No. : A-21
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, a2, No.1
5. Coordinates : 22.35N, 00.76E
6. Location : Kanlıkzey D., Harabekom Yeri, Çayırlı, Erzincan
7. Lithostratigraphic unit : intrusive rocks
8. Rock name : natrolite rock
9. Occurrence : dyke
10. Description of specimen :

Pale greenish white colored, coarse crystalline and granular. Green mafic minerals are commonly dotted.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
feldspar	moderate
natrolite	very strong

12. Remarks : refer Appendix 3-2

List of X-ray diffractive analysis

1. Sample No. : A-49
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, a2, No.2
5. Coordinates : 21.63N, 05.36E
6. Location : Taşocağı T., Cancıkkomu, Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : lateritic serpentinite
9. Occurrence : massive, weathered
10. Description of specimen :

Brownish red colored, ferruginous rock. Original part remains as dark green - yellowish green serpentinite.
This specimen is the host rock of chromite deposit and taken from trench (TA-34) at Cancıkkomu.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	strong
dolomite	moderate

12. Remarks : refer Appendix 3-3
Appendix 7-36 (TA-34)
Plate 7-6 (TA-34)

1. Sample No. : A-89
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzurum, i-45, a-1, No.1
5. Coordinates : 27.02N, 31.64E
6. Location : Taşlıyayla, Gülabikomu, Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinized harburgite, powdery serpentinite
9. Occurrence : massive
10. Description of specimen :

Dark green, fine grained. Pyroxene crystals are observable. Strongly serpentinized. This specimen is taken from trench (TY-20) at Gülabikomu and host rock of Gülabikomu chromite deposit.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	very strong

12. Remarks : refer Appendix 7-200 (TY-20)
Plate 7-9 (TY-20)

List of X-ray diffractive analysis

1. Sample No. : A-92
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzurum, i-45, a1, No.1
5. Cooridnates : 27.06 N, 30.25 E
6. Location : Henegesuyu, Hasbeykomu, Aşkale, Erzurum
7. Lithostratigraphic unit : intrusive rock
8. Rock name : natrolite rock
9. Occurrence : dyke
10. Description of specimen :

Creamy brown colored, very fine grained. Small amount of very fine, fibrous or long prismatic mafic minerals and aggregates of feldspar? are present.

11. Minerals idenfified :

name of the mineral	intensity of X-ray diffracted
feldspar	strong
natrolite	strong

12. Remarks : This specimen is similar to A-21 (Appendix 6-2)
refer Appendix 3-17

1. Sample No. : A-93
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzurum, i-45, a1, No.1
5. Coordinates : 26.29 N, 30.92 E
6. Location : Henegesuyu, Saptıran, Aşkale, Erzurum
7. Lighostratigraphic unit : intrusive rock
8. Rock name : natrolite rock
9. Occurrence : dyke
10. Description of specimen :

Pale green colored, fine grained. Large amount of white granular feldspar? and green fine granular mafic minerals are observable.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
feldspar	moderate
natrolite	very strong

12. Remarks : This specimen is similar to A-92, and A-21
refer Appendix 3-18

List of X-ray diffractive analysis

1. Sample No. : A-97
2. Project No. : 78/26
3. Area : Kopdag
4. Map No. : Erzincan, i-44, a2, No.2
5. Coordinates : 23.20N, 04.16E
6. Location : Baltadeğmez, Cancıkkomu, Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of spesimen :

This specimen is taken randomly from chromite deposit in trench (TA-6) at Baltadeğmez mine.
It is composed of powdery serpentinite and massive - powdery coarse crystalline chromite ore.
Width of orebody is more than 35 cm.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	moderate
magnesiochromite	very strong

12. Remarks : refer Appendix 7-6 (TA-6)
Plate 7-6 (TA-6)

1. Sample No. : A-114
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, a2, No.4
5. Coordinates : 19.63N, 01.17E
6. Location : Kemsakal Sr., Erbaş, Çayırlı, Erzincan
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : carbonate rock
9. Occurrence : lenticular between harzburgite (footwall-side) and terrace deposit (hangingwall-side)
10. Description of specimen :

Pure white colored, fine grained, compact and hard rock.

11. Minerals indentified :

name of the mineral	intensity of X-ray diffracted
dolomite	very strong

12. Remarks : refer Appendix 3-23

List of X-ray diffractive analysis

1. Sample No. : A-121
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, a2, No.2
5. Coordinates : 23.23N, 04.22E
6. Location : Baltadeğmez, Cancıkkomu, Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of specimen :

This specimen is taken at hangingwall contact of orebody to host rock in trench (TA-5) at Baltadeğmez mine. It is composed of pale green powdery serpentinite including large amount of magnesite network and powdery chromite ore.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	moderate
hydromagnesite	moderate
stichtite	moderate
magnesiochromite	strong

12. Remarks : refer Appendix 7-5 (TA-5)
Plate 7-6 (TA-5)

1. Sample No. : BX-1
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.1
5. Coordinates : 24.49N, 07.07E
6. Location : Orta Ezan, Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of specimen :

This specimen is taken near the gallery (GM-1). It is located at the foot-wall-side of chromite orebody. It is pale greenish white colored, powdery rock.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	very strong
stichtite	moderate
magnesiochromite	strong

12. Remarks : refer Appendix 7-249 (GM-1)
Plate 8 (GM-1)

List of X-ray diffractive analysis

1. Sample No. : BX-2
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.1
5. Coordinates : 26.38N, 06.65E
6. Location : Armutlu, Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of specimen :

This specimen is taken from the hangingwall-side of the orebody in trench (TC-1) at Armutlu.
It is creamy white colored, powdery rock.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	strong
stichtite	moderate
magnesiochromite	moderate

12. Remarks : refer Appendix 7-78 (TC-1)
Plate 7-4 (TC-1)

1. Sample No. : BX-3
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.1
5. Coordinates : 26.88N, 7.38E
6. Location : C kafa, Güllünündere, Şicankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of specimen :

This specimen is taken from the footwall-side of the orebody in trench (TZ-6) at C kafa.
It is composed of creamy white colored, powdery serpentinite.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	very strong
hydromagnesite	moderate
stichtite	strong

12. Remarks : refer Appendix 7-226 (TZ-6)
Plate 7-4 (TZ-6)

List of X-ray diffractive analysis

1. Sample No. : B-60
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzurum, i-45, a4, No.1
5. Coordinates : 14.85 N, 36.45 E
6. Location : Uzunçayır Sr., Persor Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : carbonatized serpentinite
9. Occurrence : massive
10. Description of specimen :

This is dark gray colored, coarse grained.
Serpentine is present commonly with irregular - fibrous shape.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	weak
magnesite	very strong

12. Remarks : refer Appendis 3-28

1. Sample No. : C-46
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b2, No.1
5. Coordinates : 23.78 N, 22.10 E
6. Location : Kale T., Altıntaş, Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : carbonate rock
9. Occurrence : intercalated in terrace deposit between ultrabasic rocks and Meyramdağ limestone
10. Description of specimen :

This specimen is pale brown colored, having large amount of breccia and fine cementing material. It is coarse drusy in part.
Breccia is white - pale green colored, angular and reaches to 1 cm size.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
dolomite	very strong
magnesite	very strong

12. Remarks : refer Appendix 3-35

List of X-ray diffractive analysis

1. Sample No. : CX-1
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.1
5. Coordinates : 26.84N, 06,95E
6. Location : Batı Ezan, Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : massive, fragile - powdery
10. Description of specimen :

This specimen is taken from the chromite deposit in trench (TC-7) at Batı Ezan.
It is gray colored and mostly powdery due to the weathering.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	very strong
brucite	strong
stichtite	weak
magnesiochromite	strong

12. Remarks : refer Appendix 7-83 (TC-7)
Plate 7-4 (TC-7)

1. Sample No. : CX-2
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-45, b1, No.1
5. Coordinates : 26.15N, 06.95E
6. Location : Tepebaşı, Büyükgüllünün Sr., Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : massive, fragile - powdery
10. Description of specimen :

This specimen is taken from the chromite deposit trench (TC-42) at Tepebaşı.
It is grayish green – creamy white colored, powdery due to the weathering.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	moderate
hydromagnesite	very strong
stichtite	moderate
magnesiochromite	moderate

12. Remarks : refer Appendix 7-119 (TC-42)

List of X-ray diffractive analysis

1. Sample No. : CX-3
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.1
5. Coordinates : 27.12N, 7.77E
6. Location : Sulu, Güllünündere, Sıçankale, Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinized dunite
9. Occurrence : massive, fragile — powdery
10. Description of specimen :

This specimen is taken from the footwall-side of orebody in gallery (GC-1) at Sulu.
It is gray colored and fragile.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	very strong
brucite	moderate
stichtite	weak

12. Remarks : refer Appendix 7-237 (GC-1)
Plate 8 (GC-1)

1. Sample No. : CX-4
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.1
5. Coordinates : 27.19N, 07.65E
6. Location : Sulu, Güllünündere, Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite
9. Occurrence : powdery due to the weathering
10. Description of specimen ;

This specimen is taken from the hangingwall-side of the orebody at Sulu.
It is white colored and powdery due to the weathering. Large amount of network or bead of carbonate minerals is present.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	moderate
hydromagnesite	very strong

List of X-ray diffractive analysis

1. Sample No. : D-58
2. Project No. : 78/26
3. Area : Kopdag
4. Map No. : Erzincan, i-44, b1, No.2
5. Coordinates : 28.12N, 16.82E
6. Location : Batı Coşan, Bendindere, Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinite from dunite
9. Occurrence : massive
10. Description of specimen :

    Black colored (partly brownish due to the weathering). Fine-grained, granular chromite disseminates occasionally.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	very strong
magnesiochnomite	moderate

12. Remarks : refer Appendix 3-44

1. Sample No. : D-59
2. Project No. : 78/26
3. Area : Kopdağ
4. Map No. : Erzincan, i-44, b1, No.2
5. Coordinates : 27.29N, 12.71E
6. Location : Külekçinin Sr., Sıçankale Y., Aşkale, Erzurum
7. Lithostratigraphic unit : ultrabasic rocks
8. Rock name : serpentinized dunite
9. Occurrence : massive
10. Description of specimen :

    This specimen is taken from the footwall-side at the contact to orebody in trench (TD-7) at Sıçankale.
    It is pale green colored, powdery and abundant with carbonate minerals.

11. Minerals identified :

name of the mineral	intensity of X-ray diffracted
serpentine	strong
hydromagnesite	strong

12. Remarks : refer Appendix 7-126 (TD-7) Appendix 3-40
    Plate 7-2 (TD-7)