Antarctic Meteorite Newsletter

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A periodical issued by the Meteorite Working Group to inform scientists of the basic characteristics of specimens recovered in the Antarctic.

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Curator's Comments

Kevin Righter
NASA-JSC

New meteorites and announcement of a very strange achondrite

This newsletter reports 386 new meteorites from the 2004, 2005 and 2006 ANSMET seasons from the D'Angelo Bluff (DNG), Graves Nunatak (GRA), Grosvenor Range (GRO), LaPaz Icefield (LAP), Larkman Nunatak (LAR), MacAlpine Hills (MAC), Miller Range (MIL), Mount Pratt (PRA), Roberts Massif (RBT), Scott Glacier (SCO), and Taylor Glacier (TYR) areas. There is something for everyone in this newsletter, including lunar meteorites (2), a shergottite, 3 different and unusual ungrouped achondrites (see below), H impact melts (3), howardites (2), eucrites (4), irons (4), H3 chondrites (2), an L3 chondrite, an EH3 chondrite, and a variety of carbonaceous chondrites (14 CM2, a CM1, 3 CR, 2 CK, and 4 CV).

There are four very rare meteorites in this newsletter. The most unusual of these, GRA 06129, (and its pair, GRA 06128) is difficult to classify due to its unusual composition. It has very sodic feldspar (Ab_{85}) and ferroan olivine (Fa_{59}) and pyroxene, contains high Ni FeNi metal, and has oxygen isotopic composition overlapping the Earth, Moon and enstatite meteorites. Everyone working on this sample has noted the ubiquitous sulfurous smell. This unusual composition is unlike any lunar sample yet studied, has extensive fusion crust (so it is not terrestrial), and is more oxidized than any of the enstatite meteorites. Given these features, its parent body is uncertain. Studies of its age, noble gas content and composition, trace element compositions, and volatile element contents will be very interesting. Given the reasonable size of this meteorite, there will be no shortage of material available for research. However, we nonetheless encourage researchers to form consortia that will allow the best and most efficient use of sample mass to learn more about this unusual meteorite.

Two of the other rare meteorites are lunar breccias that are unfortunately very small (< 8 g). Again, we encourage researchers to put together consortium studies to maximize scientific impact given sample mass. Finally, the fourth sample is an olivine phyric shergottite. The relation of this sample to any other olivine phyric shergottites in worldwide collections will be of great interest.

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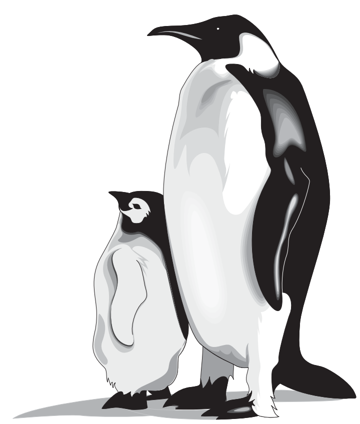
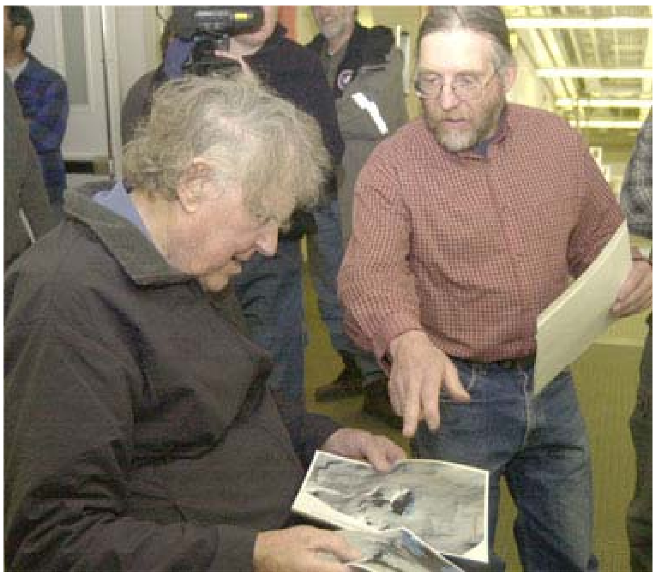


Sample Request Deadline September 14, 2007

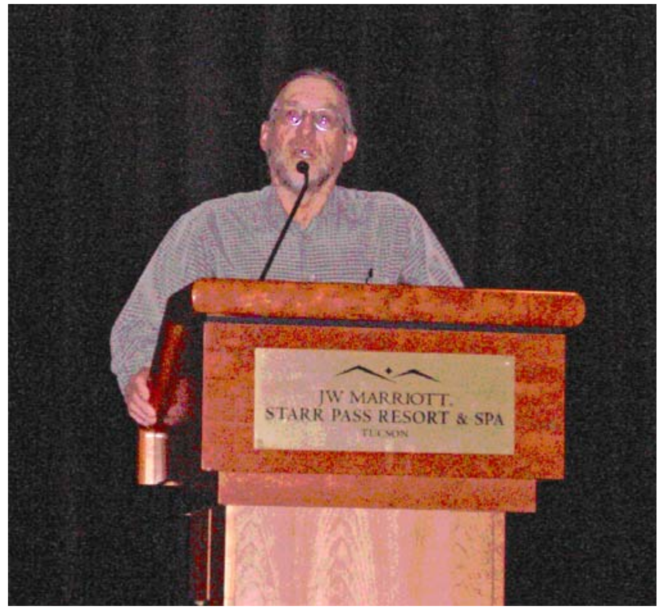
MWG Meets October 1-2, 2007

John Schutt honored at 70th Meteoritical Society meeting in Tucson

We are pleased and proud to announce that ANSMET mountaineer John Schutt has been awarded the Meteoritical Society Service Award in Tucson Arizona on August 14, 2007. Cited by Ralph Harvey at the award ceremony, John's incredible contributions to the ANSMET program and meteoritics in general were celebrated. Having been involved with 25 different field seasons and spending close to 5 years of time living in Antarctica, John has a truly unique perspective on meteorite hunting. His acceptance speech was eloquent and inspiring, giving us even more to marvel at – Congratulations, John!



John Schutt with Sir Edmund Hillary in Antarctica



Meteoritical Society Meeting, August 2007

2005-2006 sample processing completed

With this newsletter, the characterization of the 2005-2006 season meteorites is complete. Collection by the main team in the Miller Range yielded 4 HED meteorites, a beautiful rare lunar gabbro, a IIIAB iron, a small and unusual bencubbinite, 9 other carbonaceous chondrites (CM, CO), several L chondrite impact melts, and 2 enstatite chondrites. Searching at MacKay Glacier resulted in 9 carbonaceous chondrites (CK, CM, CV) and a mesosiderite. Taylor Glacier samples included an L5 and a IIE iron. A summary of the finds for '05 samples (or any other season) can be generated using our advanced search on the classification database on our webpage: http://curator.jsc.nasa.gov/antmet/query.cfm.

Personnel changes in the Antarctic Meteorite group

The Antarctic Meteorite collection at JSC has had a lot of personnel changes since the last newsletter. In March, Nancy Todd joined ARES as our new database administrator. Nancy has already demonstrated her proficiency with the FoxPro meteorite database and is making some great contributions to the curation group. In May, Penny Robinson, who made thin sections for the meteorite lab for many years – decided to leave ARES. Since Kevin Righter has been curator, Penny made >600 beautiful thin sections so her absence was felt immediately – we wish Penny the best of luck in her new endeavors. More recently, the curation group has hired Roger Harrington as a sample processor for both the lunar and meteorite collections, Michelle Crush as a new thin section technician, and Lisa Owens as a new lab technician supporting all of our collections. All four of these new colleagues will be contributing to the Antarctic Meteorite group and we are happy to have so many new people.

Lunar Meteorite Compendium

A compendium of 42 lunar meteorites was completed by the MPL staff, and placed online in May 2007. Because there are new lunar meteorites being discovered annually, these will have to be periodically updated. If you know of any research that is not mentioned or covered in the chapters, please let us know – they are intended to be comprehensive summaries of samples. Send information to: kevin.righter-1@nasa.gov. We will update them as frequently as we can.

Update on thin section recalls

In the Spring of 2007, we initiated a thin section recall for the US Antarctic Meteorite Collection. We have received many sections back from a great number of researchers, and we want to thank everyone for their cooperation. There are some PI's who have not yet responded and we will be contacting you soon. Remember, if you request samples from our collection, but have not yet complied with the thin section recall, your request will be tabled until this situation is reversed.

Reclassifications

We have a number of samples from our collection that need to be updated from the original classification, due to new information. Some of these are unusual meteorites that did not have a clear classification from the start, or which had unique features discovered after an otherwise standard classification. Others are ordinary chondrites that are initially classified by optical means.

Sample	Previous	New	Reference
PAT 91516	Iron	L7	1
PAT 91528	Iron	L7	1
GRO 95577	CM2	CR1	2
MAC 88107	CM2	Ungrouped Chondrite	3,4,5
QUE 97008	L 3.4	L 3.0	6
EET 90161	L 3.4	L 3.0	6
MET 00526	H 3.2	L 3.0	6
QUE 93148	Lodranite	Ungrouped Achondrite	7
MET 01210	Anorth. Reg. Breccia	Anorthosite-bearing basaltic fragmental Breccia	10
PCA 02007	Basaltic Reg. Breccia	Anorth. Reg. Breccia	11

The small PAT samples were originally classified as irons, but with the complete characterization of the 1991 PAT samples, and the recognition of the proximity of these samples to the PAT91501 L7 chondrite, it became clear that these are most likely small pieces of metal paired with PAT 91501 [1]. GRO 95577 was originally classified as a CM2 meteorite, but more detailed studies by [2] indicate that its bulk composition is actually that of a CR, and it has undergone more extensive aqueous alteration than a CR2, so it has been reclassified as a CR1. MAC 88107 was also originally classified as a CM2, but bulk compositional, and oxygen isotopic studies [3,4,5] all suggest that it is intermediate between CM and CO, and should be reclassified as an ungrouped carbonaceous chondrite. The several ordinary chondrites listed above were originally classified as higher grade 3, but recent approaches to classification have identified these as much lower grade, close to 3.0 [6]. Furthermore, chondrules sizes in MET 00526 are more consistent with being an L chondrite than an H [6]. As a result, they have all been reclassified accordingly. QUE 93148 was originally announced as a lodranite. Several years ago we changed this to "ungrouped achondrite", but never officially announced this. The reason is that it has bulk, trace element, and oxygen isotopic composition overlapping with the HED and pallasite groups [7]. Brecciated lunar meteorites are notoriously difficult to classify based on one or even two thin section due to sample heterogeneity on a large scale. MET 01210 was originally classified as an anorthositic regolith breccia (based on one thin section), but studies since then have recognized that it has more basaltic material than anorthositic. Similarly, PCA 02007 was originally classified as a basaltic regolith breccia, but detailed studies have shown that most clasts and material in this sample are feldspathic.

The second group of samples consists of ordinary chondrites studied by K. Welten and K. Nishiizumi for cosmic ray exposure age dating. As part of this study, they have acquired Ni and Co data for the bulk metal (using techniques described in [9]). Comparison of Co contents to the H, L, and LL groupings of [8], revealed that a subset of samples from their study were incorrectly classified [9]. Listed here are 29 samples with their previous classification, new classification and Ni and Co in the bulk metal. These are all either H or L chondrites. At the end of the list are three additional samples that have higher Ni and Co contents (where distinction between L and LL is less clear), and may be L or LL. The classification of these samples is unclear, and they are listed here to warn anyone working on these samples, that they should verify the original classification.

Sample	Previous	New	Co wt%	Ni wt%
ALH 99506	L5	H5	0.45	10.1
BTN 00305	L5	H5	0.46	10.2
BTN 00307	L6	H6	0.47	10.7
EET 99410	H6	L6	0.63	20.9
EET 99420	H5	L5	0.71	14.3
GEO 99108	L5	H5	0.45	11.8
GRA 95215	H4	L4	0.72	14.7
GRO 95527	H4	L4	0.67	14.5
GRO 95607	L6	H6	0.43	10.6
GRO 95616	L4	H4	0.47	10.9
LAP 02218	L4	H4	0.43	11.7
LEW 86085	L6	H6	0.48	9.5
MET 00442	H4	L4	0.65	16.5
MET 00444	LL6	H6	0.46	12.4
MIL 99310	L5	H5	0.49	9
PCA 02002	L5	H5	0.44	13
QUE 93182	L5	H5	0.46	11.7
QUE 93264	L6	H6	0.39	16.6
QUE 97009	L6	H6	0.48	9.9
QUE 97010	LL6	L6	0.67	16.9
QUE 97022	L5	H5	0.5	9
QUE 97027	L4	H4	0.45	11.9
QUE 97038	L6	H6	0.48	9.7
QUE 97039	L5	H5	0.47	10.3
QUE 97044	LL6	L6	0.61	19.9
QUE 97047	L5	H5	0.45	10.1
QUE 99010	L5	H5	0.47	10.3
QUE 99013	L5	H5	0.43	9.8
QUE 99017	LL5	H5	0.47	10.8
ALH 94001	L4	L/LL4?	0.9	21.5
MAC 88122	H5	L/LL5?	0.97	27.9
WIS 90300	L5	L/LL5?	1.01	24.4

Finally, Ron Fodor and Kaitlin Singer of North Carolina State University have identified five ordinary chondrites whose original classifications require revision. Microprobe analyses of several samples are presented here, along with the original classification.

Sample	Previous	New	Microprobe data
LAP 03570	LL4	L4	Fa_{23} , Fs_{13-19}
BTN 00304	LL6	L6	Fa_{24} , Fs_{21}
MCY 05212	L5	H5	Fa_{18-19} , Fs_{17-19}
LAP 03554	H4	L4	Fa_{24-25} , Fs_{19-23}

References: [1] Mittlefehldt, D.W. and Lindstrom, M.M. (1993) Meteoritics & Planetary Science, vol. 36, no. 3, p. 439-457; [2] Weisberg, M.K. and Prinz, M. (2000) Meteoritics & Planetary Science, vol. 35, Supplement, A168; [3] Russell, S.S. et al. (2000) Meteoritics & Planetary Science 35, 1051-1066; [4] Krot, A.N. et al. (2000) Meteoritics & Planetary Science 35, 1365-1386; [5] Zolensky, M.E. et al. (1993) Geochimica et Cosmochimica Acta 57, 3123-3148; [6] Grossman, J.N. and Brearley, A.J. (2005) Meteoritics & Planetary Science 40, 87-122; [7] Goodrich, C.A. and Righter, K. (2000) Meteoritics & Planetary Science 35, 521-536; [8] Afiattalab and Wasson (1980) Geochimica et Cosmochimica Acta 44, 431-443, 445, 446; [9] Welten, K. et al. (2006) Meteoritics & Planetary Science 41, 1081-1094; Welten et al. (2007) Lunar Planet. Sci. 38, #2345; [10] Arai T., Misawa K. and Kojima H. (2005) Lunar Planet. Sci. 36, #2361; [11] Korotev, R.L. and Zeigler, R.A. (2006) Geochimica et Cosmochimica Acta 70, 5935–5956.

New Meteorites

2004-2006 Collection

Pages 6-30 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 30 (1), Feb. 2007. Specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions unless they are paired with previously described meteorites. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrological type are also recast in Table 2.

Macroscopic descriptions of stony meteorites were performed at NASA/JSC. These descriptions summarize hand-specimen features observed during initial examination. Classification is based on microscopic petrography and reconnaissance-level electron microprobe analyses using polished sections prepared from a small chip of each meteorite. For each stony meteorite the sample number assigned to the preliminary examination section is included. In some cases, however, a single microscopic description was based on thin sections of several specimens believed to be members of a single fall.

Meteorite descriptions contained in this issue were contributed by the following individuals:

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Antarctic Meteorite Locations

ALH — Allan Hills
BEC — Beckett Nunatak
BOW — Bowden Neve
BTN — Bates Nunataks
CMS — Cumulus Hills
CRA — Mt.Cranfield Ice Field
CRE — Mt. Crean
DAV — David Glacier
DEW — Mt. DeWitt
DNG — D'Angelo Bluff
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
FIN — Finger Ridge
GDR — Gardner Ridge
GEO — Geologists Range
GRA — Graves Nunataks
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
KLE — Klein Ice Field
LAP — LaPaz Ice Field
LAR — Larkman Nunatak
LEW — Lewis Cliff
LON — Lonewolf Nunataks
MAC — MacAlpine Hills
MBR — Mount Baldr
MCY — MacKay Glacier
MET — Meteorite Hills
MIL — Miller Range
ODE — Odell Glacier
OTT — Outpost Nunatak
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
PRA — Mt. Pratt
PRE — Mt. Prestrud
QUE — Queen Alexandra Range
RBT — Roberts Massif
RKP — Reckling Peak
SAN — Sandford Cliffs
SCO — Scott Glacier
STE — Stewart Hills
TEN — Tentacle Ridge
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

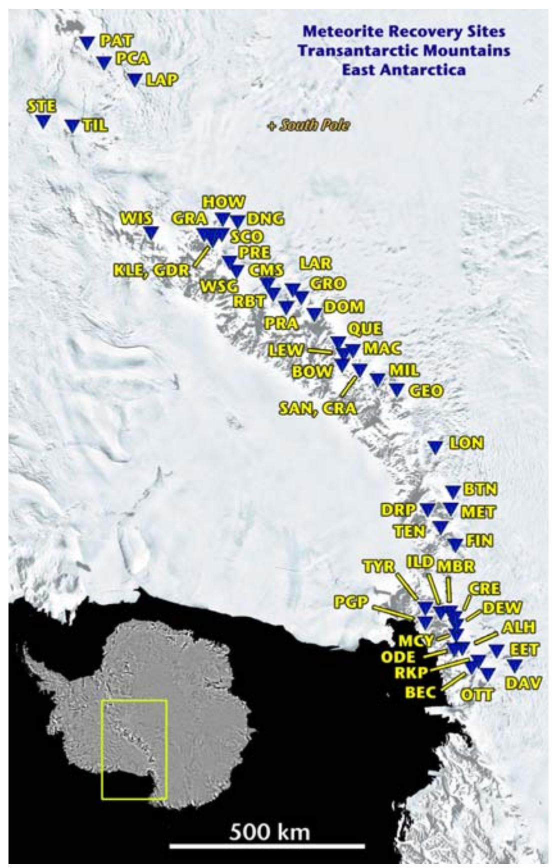

Table 1

List of Newly Classified Antarctic Meteorites **

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04444	~	168.6	L6 CHONDRITE	A/B	B		
LAP 04446	~	202.5	LL5 CHONDRITE	B	A/B		
LAP 04448	~	122.6	L5 CHONDRITE	A/B	B		
LAP 04449	~	105.5	LL5 CHONDRITE	B	B		
LAP 04450	~	102.2	L5 CHONDRITE	B/C	B		
LAP 04451	~	151.0	L5 CHONDRITE	C	B		
LAP 04452	~	109.8	L5 CHONDRITE	B	B		
LAP 04453	~	85.4	L5 CHONDRITE	B	A/B		
LAP 04454	~	96.7	L6 CHONDRITE	B	B		
LAP 04455	~	52.8	L6 CHONDRITE	C	B		
LAP 04456	~	38.9	L5 CHONDRITE	B	B		
LAP 04457	~	32.4	L6 CHONDRITE	B/C	A/B		
LAP 04458	~	59.9	L6 CHONDRITE	C	A/B		
LAP 04459	~	63.7	L5 CHONDRITE	B/C	B		
LAP 04460	~	118.4	L5 CHONDRITE	A/B	A/B		
LAP 04461	~	27.9	L5 CHONDRITE	B	A/B		
LAP 04462		45.9	H CHONDRITE (IMPACT MELT)	C	C	18	16
LAP 04463	~	53.2	L5 CHONDRITE	A/B	B		
LAP 04464	~	31.9	LL6 CHONDRITE	B	B		
LAP 04465	~	46.8	H5 CHONDRITE	B	B		
LAP 04466	~	29.4	L6 CHONDRITE	B/C	A/B		
LAP 04467	~	34.4	L6 CHONDRITE	B/C	A/B		
LAP 04468	~	16.8	L6 CHONDRITE	B/C	B		
LAP 04469	~	30.5	L6 CHONDRITE	C	B		
LAP 04470	~	19.4	L5 CHONDRITE	C	A/B		
LAP 04471	~	6.1	L5 CHONDRITE	B/C	B		
LAP 04472	~	22.3	L5 CHONDRITE	C	A/B		
LAP 04473	~	9.6	L5 CHONDRITE	C	B		
LAP 04474	~	25.1	L5 CHONDRITE	C	A/B		
LAP 04475		13.8	L3 CHONDRITE	B	B	5-37	12-22
LAP 04476	~	10.0	L5 CHONDRITE	B/C	B		
LAP 04477	~	25.5	LL5 CHONDRITE	B	A/B		
LAP 04478	~	7.3	L5 CHONDRITE	C	C		
LAP 04479	~	5.5	LL5 CHONDRITE	C	B		
LAP 04480	~	9.5	LL5 CHONDRITE	A/B	A/B		
LAP 04481	~	12.6	L6 CHONDRITE	B/C	A		
LAP 04482	~	15.6	L5 CHONDRITE	A	A		
LAP 04483	~	18.3	LL5 CHONDRITE	A/B	A/B		
LAP 04484	~	11.8	L5 CHONDRITE	C	C		
LAP 04485	~	15.1	L5 CHONDRITE	B/C	B/C		
LAP 04486	~	9.7	L5 CHONDRITE	B	A/B		
LAP 04487	~	12.8	L5 CHONDRITE	C	A/B		
LAP 04488	~	9.8	L4 CHONDRITE	C	B		
LAP 04489	~	2.7	L6 CHONDRITE	C	A/B		
LAP 04490	~	3.7	L5 CHONDRITE	B/C	A		
LAP 04491	~	4.0	L5 CHONDRITE	B/C	B		
LAP 04492	~	6.8	L6 CHONDRITE	B	A/B		
LAP 04493	~	2.9	L5 CHONDRITE	B	B		
LAP 04494	~	5.0	L5 CHONDRITE	B	B		
LAP 04495	~	3.4	H5 CHONDRITE	C	A		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04496 ~	5.7	H6 CHONDRITE	C	A/B		
LAP 04497 ~	7.6	LL5 CHONDRITE	B	A/B		
LAP 04498 ~	12.5	H6 CHONDRITE	C	A/B		
LAP 04499 ~	2.8	H6 CHONDRITE	C	B		
LAP 04500 ~	2.1	H6 CHONDRITE	C	A		
LAP 04501 ~	1.7	H6 CHONDRITE	C	A/B		
LAP 04502 ~	1.6	L6 CHONDRITE	B/C	B		
LAP 04503 ~	4.0	L5 CHONDRITE	B	A/B		
LAP 04504 ~	3.7	H5 CHONDRITE	C	A		
LAP 04505	2.5	H6 CHONDRITE	B	B	18	16
LAP 04506 ~	2.0	LL6 CHONDRITE	A/B	B		
LAP 04507 ~	2.8	H6 CHONDRITE	C	C		
LAP 04508 ~	2.4	H6 CHONDRITE	C	A/B		
LAP 04509 ~	2.0	H6 CHONDRITE	C	A/B		
LAP 04510 ~	31.1	H6 CHONDRITE	C	B		
LAP 04511 ~	17.1	H5 CHONDRITE	C	B/C		
LAP 04512 ~	19.5	L6 CHONDRITE	B/C	B		
LAP 04513 ~	17.5	L5 CHONDRITE	C	B		
LAP 04514	14.8	CM2 CHONDRITE	B	B	0-64	1
LAP 04515 ~	7.2	L5 CHONDRITE	C	B		
LAP 04516	26.3	CR2 CHONDRITE	B	B	1-6	1-3
LAP 04517 ~	7.8	H5 CHONDRITE	B	B		
LAP 04518 ~	19.7	L5 CHONDRITE	B/C	A/B		
LAP 04519 ~	26.3	L5 CHONDRITE	B/C	B		
LAP 04520 ~	1.7	H6 CHONDRITE	C	C		
LAP 04521	7.1	H5 CHONDRITE	B/C	B	19	17
LAP 04522 ~	7.2	LL6 CHONDRITE	A/B	A		
LAP 04523 ~	14.2	H6 CHONDRITE	C	A/B		
LAP 04524 ~	2.3	L6 CHONDRITE	B/C	A		
LAP 04525 ~	6.8	L5 CHONDRITE	B/C	B		
LAP 04526 ~	2.4	LL5 CHONDRITE	C	A/B		
LAP 04527	2.0	CM2 CHONDRITE	B	B	1-60	1
LAP 04528 ~	15.6	H5 CHONDRITE	C	B		
LAP 04529 ~	3.1	L5 CHONDRITE	C	B		
LAP 04550 ~	23.0	L5 CHONDRITE	B/C	A/B		
LAP 04551 ~	15.6	L6 CHONDRITE	C	A/B		
LAP 04552	11.4	CM2 CHONDRITE	C	C	1-39	1-5
LAP 04553 ~	7.6	L6 CHONDRITE	B	A/B		
LAP 04554 ~	14.2	L5 CHONDRITE	B	A/B		
LAP 04555 ~	23.7	LL5 CHONDRITE	A/B	A		
LAP 04556	43.7	H4 CHONDRITE	B/C	B	19	17
LAP 04557 ~	25.3	LL5 CHONDRITE	A/B	A		
LAP 04558 ~	7.4	H6 CHONDRITE	C	B/C		
LAP 04559 ~	17.0	L6 CHONDRITE	B/C	B		
LAP 04560 ~	38.7	L5 CHONDRITE	B	B		
LAP 04561 ~	6.7	L5 CHONDRITE	C	B		
LAP 04562 ~	5.5	H6 CHONDRITE	C	C		
LAP 04563 ~	6.8	L4 CHONDRITE	B	B		
LAP 04564 ~	4.1	L6 CHONDRITE	C	B		
LAP 04565	7.1	CM2 CHONDRITE	B	B	1-56	1
LAP 04566 ~	9.9	LL6 CHONDRITE	C	B		
LAP 04567 ~	3.1	L5 CHONDRITE	C	B		
LAP 04568 ~	3.1	LL6 CHONDRITE	A/B	A/B		
LAP 04569 ~	1.9	LL5 CHONDRITE	A	A		
LAP 04570 ~	4.0	L5 CHONDRITE	B/C	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04571 ~	6.0	LL5 CHONDRITE	B	B		
LAP 04572	6.6	CK5 CHONDRITE	B	A/B	36	30
LAP 04573 ~	4.0	LL6 CHONDRITE	B	B		
LAP 04574 ~	10.1	L6 CHONDRITE	C	A		
LAP 04575 ~	8.2	L5 CHONDRITE	C	B		
LAP 04576 ~	1.8	L6 CHONDRITE	C	A/B		
LAP 04577 ~	4.9	LL5 CHONDRITE	B	B		
LAP 04578	4.4	L5 CHONDRITE	C	B	24	21
LAP 04579 ~	5.7	LL6 CHONDRITE	B	B		
LAP 04580 ~	21.9	H6 CHONDRITE	C	B		
LAP 04581	16.0	LL5 CHONDRITE	A/B	A/B	31	25
LAP 04582 ~	86.9	LL6 CHONDRITE	B/C	B		
LAP 04583 ~	81.8	LL6 CHONDRITE	A	A/B		
LAP 04584 ~	33.3	LL5 CHONDRITE	B/C	A/B		
LAP 04585 ~	26.7	L5 CHONDRITE	C	B		
LAP 04586 ~	30.2	LL5 CHONDRITE	B	A/B		
LAP 04587 ~	26.1	L5 CHONDRITE	B/C	B		
LAP 04588	11.0	CM2 CHONDRITE		A/B	1-40	1-8
LAP 04589 ~	10.3	LL6 CHONDRITE	B/C	B		
LAP 04590 ~	19.9	L5 CHONDRITE	C	A/B		
LAP 04591 ~	5.4	L5 CHONDRITE	B/C	B		
LAP 04592	13.1	CR2 CHONDRITE	B/C	A/B	1-3	1-6
LAP 04593 ~	16.6	L5 CHONDRITE	B/C	B		
LAP 04594 ~	7.5	H6 CHONDRITE	B/C	B		
LAP 04595 ~	3.3	H6 CHONDRITE	C	B		
LAP 04596 ~	2.0	LL5 CHONDRITE	B	B		
LAP 04597 ~	13.6	H6 CHONDRITE	B/C	B		
LAP 04598 ~	24.0	LL5 CHONDRITE	B/C	C		
LAP 04599 ~	41.3	L5 CHONDRITE	B/C	B		
LAP 04600 ~	21.0	LL6 CHONDRITE	B	B		
LAP 04601 ~	48.8	L6 CHONDRITE	B/C	B		
LAP 04602 ~	20.1	L5 CHONDRITE	A/B	A/B		
LAP 04603 ~	20.4	L5 CHONDRITE	C	B/C		
LAP 04604 ~	30.1	LL5 CHONDRITE	B/C	B		
LAP 04605 ~	63.0	L5 CHONDRITE	B/C	B		
LAP 04606 ~	21.0	L6 CHONDRITE	C	B		
LAP 04607 ~	33.0	L6 CHONDRITE	C	A/B		
LAP 04608 ~	15.5	L5 CHONDRITE	C	B		
LAP 04609 ~	27.4	LL6 CHONDRITE	A/B	A		
LAP 04610 ~	18.8	LL5 CHONDRITE	B	B		
LAP 04611 ~	37.2	LL5 CHONDRITE	A/B	A/B		
LAP 04612	22.4	L3 CHONDRITE	B	A/B	8-25	4-19
LAP 04613 ~	17.8	L6 CHONDRITE	B/C	A		
LAP 04614	5.7	H CHONDRITE (IMPACT MELT)	C	C	19	17
LAP 04615 ~	9.4	L5 CHONDRITE	C	A/B		
LAP 04616 ~	19.3	L5 CHONDRITE	B	A/B		
LAP 04617 ~	22.8	LL6 CHONDRITE	B	C		
LAP 04618 ~	10.0	L5 CHONDRITE	C	B		
LAP 04619 ~	16.3	LL5 CHONDRITE	A/B	A		
LAP 04620 ~	6.1	L5 CHONDRITE	B	B		
LAP 04621 ~	8.0	L5 CHONDRITE	B	A/B		
LAP 04622 ~	7.4	L6 CHONDRITE	B	B		
LAP 04623 ~	5.0	LL5 CHONDRITE	A/B	A/B		
LAP 04624 ~	5.9	L5 CHONDRITE	B	A/B		
LAP 04625 ~	6.1	L5 CHONDRITE	A/B	A/B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04626	~	6.3	L6 CHONDRITE	B	B		
LAP 04627	~	4.7	LL5 CHONDRITE	A/B	A/B		
LAP 04628	~	3.1	L6 CHONDRITE	C	B/C		
LAP 04629	~	2.8	L5 CHONDRITE	C	B/C		
LAP 04630	~	4.0	L6 CHONDRITE	C	B/C		
LAP 04631	~	5.5	L6 CHONDRITE	B/C	B		
LAP 04632	~	8.5	L6 CHONDRITE	B/C	B		
LAP 04633	~	1.9	L6 CHONDRITE	C	C		
LAP 04634	~	3.2	L5 CHONDRITE	C	B		
LAP 04635	~	6.8	L5 CHONDRITE	C	B		
LAP 04636	~	4.1	L6 CHONDRITE	C	A/B		
LAP 04637	~	5.2	L6 CHONDRITE	C	B		
LAP 04638	~	3.5	L6 CHONDRITE	C	A/B		
LAP 04639	~	3.8	L6 CHONDRITE	C	B		
LAP 04650	~	49.6	L5 CHONDRITE	B	A/B		
LAP 04651	~	43.9	L5 CHONDRITE	B	A/B		
LAP 04652	~	27.7	L5 CHONDRITE	B	A		
LAP 04653	~	47.2	L5 CHONDRITE	B/C	B		
LAP 04654	~	56.8	L5 CHONDRITE	B	A/B		
LAP 04655	~	29.0	LL5 CHONDRITE	A/B	A/B		
LAP 04656	~	35.3	L5 CHONDRITE	B	A/B		
LAP 04657	~	34.7	LL6 CHONDRITE	A/B	A/B		
LAP 04658	~	25.6	L5 CHONDRITE	B/C	A/B		
LAP 04659	~	29.8	L5 CHONDRITE	B/C	B		
LAP 04660	~	22.7	H6 CHONDRITE	B	A/B		
LAP 04661	~	43.9	L6 CHONDRITE	B/C	B		
LAP 04662	~	13.4	L6 CHONDRITE	C	B		
LAP 04663	~	11.6	LL5 CHONDRITE	B	B		
LAP 04664	~	15.8	L6 CHONDRITE	C	B		
LAP 04665	~	8.9	L6 CHONDRITE	C	B		
LAP 04666	~	12.7	L6 CHONDRITE	A/B	A/B		
LAP 04667	~	9.8	L6 CHONDRITE	C	B		
LAP 04668	~	10.3	L6 CHONDRITE	C	B		
LAP 04669	~	3.9	L6 CHONDRITE	A/B	B		
LAP 04670	~	8.1	L6 CHONDRITE	B/C	B/C		
LAP 04671	~	5.4	LL5 CHONDRITE	B/C	B		
LAP 04672		3.7	H5 CHONDRITE	C	B	19	17
LAP 04673	~	8.6	L5 CHONDRITE	C	B		
LAP 04674	~	6.2	L6 CHONDRITE	B/C	B		
LAP 04675		6.6	CM2 CHONDRITE	B	B	1-50	1-5
LAP 04676	~	9.3	L5 CHONDRITE	B/C	B		
LAP 04677	~	13.5	L5 CHONDRITE	C	B		
LAP 04678	~	21.3	L6 CHONDRITE	C	B		
LAP 04679	~	8.8	LL6 CHONDRITE	B	B		
LAP 04680		14.0	CM2 CHONDRITE	B/C	B	1-50	1-2
LAP 04681	~	34.2	LL4 CHONDRITE	A/B	A/B		
LAP 04682	~	41.4	L5 CHONDRITE	C	B		
LAP 04683	~	32.4	H5 CHONDRITE	C	A/B		
LAP 04684	~	22.3	LL6 CHONDRITE	A/B	A/B		
LAP 04685	~	17.5	L4 CHONDRITE	B	A/B		
LAP 04686	~	26.3	L6 CHONDRITE	C	B		
LAP 04687	~	11.3	H6 CHONDRITE	C	B		
LAP 04688	~	19.6	H6 CHONDRITE	C	B		
LAP 04689		11.2	H5 CHONDRITE	C	C	19	17
LAP 04690	~	10.2	L6 CHONDRITE	C	A/B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04691	~	11.7	L5 CHONDRITE	B	A		
LAP 04692	~	12.6	L6 CHONDRITE	C	C		
LAP 04693	~	11.3	L5 CHONDRITE	B/C	B		
LAP 04694	~	7.5	L5 CHONDRITE	C	B		
LAP 04695	~	7.4	L5 CHONDRITE	C	B		
LAP 04696	~	7.4	LL5 CHONDRITE	A/B	A		
LAP 04697	~	2.8	L5 CHONDRITE	C	B		
LAP 04698	~	5.4	L5 CHONDRITE	C	B		
LAP 04699	~	6.9	L5 CHONDRITE	C	B		
LAP 04700	~	7.1	L5 CHONDRITE	C	A		
LAP 04701	~	7.6	L5 CHONDRITE	B/C	A/B		
LAP 04702	~	4.6	LL5 CHONDRITE	A/B	A/B		
LAP 04703	~	6.1	H5 CHONDRITE	B/C	A/B		
LAP 04704	~	4.1	H6 CHONDRITE	B/C	A		
LAP 04705	~	1.9	H6 CHONDRITE	C	A		
LAP 04706	~	2.7	L5 CHONDRITE	B	B		
LAP 04707	~	1.9	L6 CHONDRITE	B/C	A/B		
LAP 04708	~	1.1	L5 CHONDRITE	B	B		
LAP 04709	~	0.7	L6 CHONDRITE	B	B		
LAP 04730	~	26.5	LL5 CHONDRITE	A/B	B/C		
LAP 04731	~	14.5	L6 CHONDRITE	A	A		
LAP 04732	~	25.8	L5 CHONDRITE	C	B		
LAP 04733	~	20.1	LL5 CHONDRITE	A/B	A		
LAP 04734	~	26.7	L6 CHONDRITE	C	B		
LAP 04735	~	22.1	L5 CHONDRITE	B/C	B/C		
LAP 04736	~	15.1	H6 CHONDRITE	C	B		
LAP 04737	~	14.3	L5 CHONDRITE	B	B/C		
LAP 04738	~	20.4	LL5 CHONDRITE	B	B		
LAP 04739	~	6.6	H5 CHONDRITE	B/C	B		
LAP 04740	~	9.8	LL5 CHONDRITE	A/B	A/B		
LAP 04741		3.2	H5 CHONDRITE	B	B	19	17
LAP 04742	~	11.6	L5 CHONDRITE	B/C	A/B		
LAP 04743	~	3.0	L6 CHONDRITE	B	B		
LAP 04744	~	10.8	LL6 CHONDRITE	B	B		
LAP 04745		3.2	H CHONDRITE (IMPACT MELT)	C	B	19	17
LAP 04746	~	7.7	L5 CHONDRITE	C	A		
LAP 04747	~	11.9	LL6 CHONDRITE	B	B		
LAP 04748	~	7.5	L6 CHONDRITE	C	A/B		
LAP 04749	~	5.9	L4 CHONDRITE	C	A/B		
LAP 04760		1.1	CM2 CHONDRITE	B	A/B	1-38	42
LAP 04761	~	2.7	L5 CHONDRITE	B	B		
LAP 04762	~	3.4	L6 CHONDRITE	C	B		
LAP 04763	~	2.5	H6 CHONDRITE	C	A/B		
LAP 04764	~	2.7	L6 CHONDRITE	C	B		
LAP 04765	~	2.7	L6 CHONDRITE	C	B		
LAP 04766	~	1.1	L6 CHONDRITE	C	B		
LAP 04767	~	6.5	L6 CHONDRITE	B/C	B		
LAP 04768	~	2.0	L5 CHONDRITE	B/C	B		
LAP 04769	~	3.4	LL5 CHONDRITE	A	A		
LAP 04790	~	66.0	LL5 CHONDRITE	A/B	A/B		
LAP 04791	~	50.8	LL5 CHONDRITE	B	A/B		
LAP 04792	~	39.7	L5 CHONDRITE	B/C	B		
LAP 04793	~	34.6	LL5 CHONDRITE	B/C	B		
LAP 04794	~	37.7	L5 CHONDRITE	C	B		
LAP 04795	~	56.0	LL5 CHONDRITE	B	A/B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 04796	15.7	CM2 CHONDRITE	A/B	A/B	1-36	1
LAP 04797 ~	49.8	LL6 CHONDRITE	A/B	A/B		
LAP 04798 ~	69.6	LL5 CHONDRITE	A/B	A/B		
LAP 04799 ~	14.0	L6 CHONDRITE	C	A/B		
LAP 04800 ~	32.4	L5 CHONDRITE	B	A/B		
LAP 04801 ~	18.5	L5 CHONDRITE	C	B		
LAP 04802 ~	23.1	L5 CHONDRITE	B	B		
LAP 04803 ~	27.9	L5 CHONDRITE	A/B	B		
LAP 04804 ~	19.5	L5 CHONDRITE	B/C	B		
LAP 04805 ~	14.6	L5 CHONDRITE	B/C	B		
LAP 04806 ~	14.5	L5 CHONDRITE	C	A/B		
LAP 04807	11.6	CM2 CHONDRITE	B/C	A/B	1-61	5
LAP 04808 ~	20.1	H5 CHONDRITE	B/C	A/B		
LAP 04809	15.8	CM2 CHONDRITE	B	B	1-46	
LAP 04810 ~	15.2	L6 CHONDRITE	B/C	B		
LAP 04811 ~	8.7	L6 CHONDRITE	B/C	B		
LAP 04812 ~	20.6	LL6 CHONDRITE	B	A/B		
LAP 04813 ~	9.9	LL6 CHONDRITE	B	A/B		
LAP 04814 ~	8.4	LL6 CHONDRITE	A	A/B		
LAP 04815 ~	12.1	L6 CHONDRITE	B/C	B		
LAP 04816 ~	15.1	L6 CHONDRITE	C	B		
LAP 04817 ~	14.7	H5 CHONDRITE	C	B		
LAP 04818 ~	13.9	L6 CHONDRITE	C	B		
LAP 04819 ~	16.3	LL5 CHONDRITE	A/B	A/B		
LAP 04820 ~	14.7	H5 CHONDRITE	B/C	A/B		
LAP 04821 ~	22.0	L6 CHONDRITE	B/C	A/B		
LAP 04822 ~	4.9	L6 CHONDRITE	C	C		
LAP 04823 ~	9.7	L6 CHONDRITE	B/C	A		
LAP 04824	1.7	CM1 CHONDRITE	B	B		
LAP 04825 ~	6.1	L5 CHONDRITE	C	A/B		
LAP 04826 ~	5.8	LL6 CHONDRITE	A/B	A		
LAP 04827 ~	3.0	LL6 CHONDRITE	A/B	A		
LAP 04828 ~	7.0	L5 CHONDRITE	C	B/C		
LAP 04829 ~	14.9	LL5 CHONDRITE	A/B	B		
LAR 04364	5.8	CV3 CHONDRITE	CE	B	1-36	
LAR 04369	0.6	H METAL	C	C	19	17
LAR 04380	14.0	L3 CHONDRITE	B	A	17-31	6-27
LAR 04382	43.7	H3 CHONDRITE	B	A	6-30	1-13
MAC 04860 ~	6.2	H6 CHONDRITE	C	B		
MAC 04861 ~	2.4	L5 CHONDRITE	B/C	A		
MAC 04869 ~	3.3	L5 CHONDRITE	B/C	A		
MAC 04993 ~	18.6	L5 CHONDRITE	B	B		
MAC 04996 ~	2.1	H5 CHONDRITE	B/C	B		
MAC 04997 ~	6.8	L5 CHONDRITE	B/C	B		
MAC 04998 ~	18.3	L5 CHONDRITE	B	A/B		
MAC 04999 ~	13.5	L5 CHONDRITE	B/C	B		
MAC 041000 ~	32.3	H6 CHONDRITE	C	C		
MAC 041001 ~	12.4	H5 CHONDRITE	B	A/B		
MAC 041002 ~	19.2	H5 CHONDRITE	B	A/B		
MAC 041003 ~	5.5	H5 CHONDRITE	B/C	B		
MAC 041004 ~	6.6	L5 CHONDRITE	B/C	A/B		
MAC 041005 ~	5.2	H6 CHONDRITE	C	B		
MAC 041006 ~	8.3	L5 CHONDRITE	B	A/B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MAC 041007	~	5.6	H5 CHONDRITE	B	A/B		
MAC 041008	~	16.8	L6 CHONDRITE	A/B	A/B		
MAC 041009	~	4.9	H5 CHONDRITE	B	B		
MAC 041020	~	1.4	L5 CHONDRITE	C	B		
MAC 041022	~	2.2	H5 CHONDRITE	B/C	B		
MAC 041023	~	3.8	H5 CHONDRITE	B/C	B		
MAC 041024	~	4.5	L5 CHONDRITE	B/C	B		
MAC 041240	~	4.0	L5 CHONDRITE	C	A/B		
MAC 041241	~	1.4	L5 CHONDRITE	C	A/B		
MAC 041242	~	2.4	L5 CHONDRITE	B	A/B		
MAC 041243	~	3.1	L5 CHONDRITE	B	B		
MAC 041244	~	3.1	L5 CHONDRITE	C	A/B		
MAC 041245	~	2.9	L6 CHONDRITE	C	B		
MAC 041246	~	2.1	L6 CHONDRITE	C	B		
MAC 041247	~	2.0	L5 CHONDRITE	B/C	B		
MAC 041248	~	5.4	L6 CHONDRITE	C	B		
MAC 041249	~	2.8	L5 CHONDRITE	C	A/B		
MAC 041250	~	1.2	L5 CHONDRITE	B	B		
MAC 041251	~	1.5	LL5 CHONDRITE	A/B	A		
MAC 041252	~	3.0	L4 CHONDRITE	B/C	A		
MAC 041253	~	1.2	L5 CHONDRITE	B	B		
MAC 041254	~	1.6	L5 CHONDRITE	C	A		
MAC 041255	~	5.5	L5 CHONDRITE	B	A/B		
MAC 041256	~	3.6	L5 CHONDRITE	B/C	A/B		
MAC 041257	~	3.3	L4 CHONDRITE	B/C	A/B		
MAC 041258	~	2.9	L5 CHONDRITE	C	B		
MAC 041259	~	1.9	L5 CHONDRITE	C	A/B		
PRA 04414		104.4	H4 CHONDRITE	B	B	18	16-23
RBT 04127	~	3805.2	LL5 CHONDRITE	A	A		
RBT 04143		89.6	CV3 CHONDRITE	B	A/B	1-69	1-3
RBT 04251		19.5	H3 CHONDRITE	B	A/B	1-20	1-6
RBT 04255		10.2	ACHON. UNGROUPED	C	B	24	21
RBT 04263	~	711.4	LL5 CHONDRITE	B	A/B		
RBT 04264	~	576.5	L5 CHONDRITE	C	A/B		
RBT 04265	~	401.3	LL5 CHONDRITE	B	A/B		
RBT 04266	~	739.7	L6 CHONDRITE	B/C	B/C		
RBT 04267	~	564.3	L5 CHONDRITE	B	B		
RBT 04268	~	714.8	L5 CHONDRITE	C	B		
RBT 04269	~	616.3	LL5 CHONDRITE	B	B		
MIL 05069		76.5	EH3 CHONDRITE	C	A/B	0-1	0-2
MIL 05147		4.9	IRON-IIIAB	A	A		
TYR 05181		544.1	IRON-IIE	A	A		19
DNG 06004		47.4	CM2 CHONDRITE	B	A/B	1-44	3
GRA 06100		421.8	CR2 CHONDRITE	B	A/B	1-15	1-3
GRA 06101		3555.0	CV3 CHONDRITE	B	A/B	1-23	0-1
GRA 06128		447.6	ACHON. UNGROUPED	CE	C		
GRA 06129		196.5	ACHON. UNGROUPED	C	B/C	59	19-44
GRA 06130		13.6	CV3 CHONDRITE	BE	B	1-32	0-2
GRA 06131		7.3	CM2 CHONDRITE	B/C	B/C	1-23	

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
GRA 06157	0.8	LUNAR-ANORTH. BRECCIA	A/B	A/B	7-54	19-66
GRA 06172	21.1	CM2 CHONDRITE	B	B	1-44	3
GRA 06173	5.5	CK4 CHONDRITE	A/B	A/B	31	
GRA 06189	2.9	EUCRITE (UNBRECCIATED)	B	B		60
GRO 06082	52.5	LL6 CHONDRITE	B/C	B/C	31	25
LAR 06319	78.6	SHERGOTTITE	A/B	A/B	25-48	25-51
LAR 06621	20.2	HOWARDITE	A/B	A/B		19-60
LAR 06638	5.3	LUNAR-ANORTH. BRECCIA	A/B	A/B	28-33	27-39
LAR 06870	15.4	EUCRITE (BRECCIATED)	A/B	A/B		60
LAR 06875	165.8	EUCRITE (BRECCIATED)	B/C	B/C		61
LAR 06876	475.3	IRON-IAB	A	A	5	6
LAR 06877	588.2	IRON-IIIAB	A	A		
SCO 06040	60.2	HOWARDITE	A/B	A/B		19-65
SCO 06041	45.2	EUCRITE (BRECCIATED)	A	A		49

Table 2

Newly Classified Specimens Listed By Type

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		Achondrites				
GRA 06128	447.6	ACHON. UNGROUPED	CE	C		
GRA 06129	196.5	ACHON. UNGROUPED	C	B/C	59	19-44
RBT 04255	10.2	ACHON. UNGROUPED	C	B	24	21
LAR 06870	15.4	EUCRITE (BRECCIATED)	A/B	A/B		60
LAR 06875	165.8	EUCRITE (BRECCIATED)	B/C	B/C		61
SCO 06041	45.2	EUCRITE (BRECCIATED)	A	A		49
GRA 06189	2.9	EUCRITE (UNBRECCIATED)	B	B		60
LAR 06621	20.2	HOWARDITE	A/B	A/B		19-60
SCO 06040	60.2	HOWARDITE	A/B	A/B		19-65
GRA 06157	0.8	LUNAR-ANORTH. BRECCIA	A/B	A/B	7-54	19-66
LAR 06638	5.3	LUNAR-ANORTH. BRECCIA	A/B	A/B	28-33	27-39
LAR 06319	78.6	SHERGOTTITE	A/B	A/B	25-48	25-51
		Carbonaceous Chondrites				
LAP 04572	6.6	CK5 CHONDRITE	B	A/B	36	30
GRA 06173	5.5	CK4 CHONDRITE	A/B	A/B	31	
LAP 04824	1.7	CM1 CHONDRITE	B	B		
LAP 04514	14.8	CM2 CHONDRITE	B	B	0-64	1
LAP 04527	2.0	CM2 CHONDRITE	B	B	1-60	1
LAP 04552	11.4	CM2 CHONDRITE	C	C	1-39	1-5
LAP 04565	7.1	CM2 CHONDRITE	B	B	1-56	1
LAP 04588	11.0	CM2 CHONDRITE	C	A/B	1-40	1-8
LAP 04675	6.6	CM2 CHONDRITE	B	B	1-50	1-5
LAP 04680	14.0	CM2 CHONDRITE	B/C	B	1-50	1-2
LAP 04760	1.1	CM2 CHONDRITE	B	A/B	1-38	42
LAP 04796	15.7	CM2 CHONDRITE	A/B	A/B	1-36	1
LAP 04807	11.6	CM2 CHONDRITE	B/C	A/B	1-61	5
LAP 04809	15.8	CM2 CHONDRITE	B	B	1-46	
DNG 06004	47.4	CM2 CHONDRITE	B	A/B	1-44	3
GRA 06131	7.3	CM2 CHONDRITE	B/C	B/C	1-23	
GRA 06172	21.1	CM2 CHONDRITE	B	B	1-44	3
LAP 04516	26.3	CR2 CHONDRITE	B	B	1-6	1-3
LAP 04592	13.1	CR2 CHONDRITE	B/C	A/B	1-3	1-6
GRA 06100	421.8	CR2 CHONDRITE	B	A/B	1-15	1-3

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAR 04364	5.8	CV3 CHONDRITE	CE	B	1-36	
RBT 04143	89.6	CV3 CHONDRITE	B	A/B	1-69	1-3
GRA 06101	3555.0	CV3 CHONDRITE	B	A/B	1-23	0-1
GRA 06130	13.6	CV3 CHONDRITE	BE	B	1-32	0-2
		Chondrites - Type 3				
LAR 04382	43.7	H3 CHONDRITE	B	A	6-30	1-13
RBT 04251	19.5	H3 CHONDRITE	B	A/B	1-20	1-6
LAP 04475	13.8	L3 CHONDRITE	B	B	5-37	12-22
LAP 04612	22.4	L3 CHONDRITE	B	A/B	8-25	4-19
LAR 04380	14.0	L3 CHONDRITE	B	A	17-31	6-27
		E Chondrites				
MIL 05069	76.5	EH3 CHONDRITE	C	A/B	0-1	0-2
		H Chondrites				
LAP 04462	45.9	H CHONDRITE (IMPACT MELT)	C	C	18	16
LAP 04614	5.7	H CHONDRITE (IMPACT MELT)	C	C	19	17
LAP 04745	3.2	H CHONDRITE (IMPACT MELT)	C	B	19	17
		Irons				
LAR 06876	475.3	IRON-IAB	A	A	5	6
LAR 06877	588.2	IRON-IIIAB	A	A		
TYR 05181	544.1	IRON-IIE	A	A		19
MIL 05147	4.9	IRON-IIIAB	A	A		

**Notes to Tables 1 and 2:

"Weathering" Categories:

A: Minor rustiness; rust haloes on metal particles and rust stains along fractures are minor.
B: Moderate rustiness; large rust haloes occur on metal particles and rust stains on internal fractures are extensive.
C: Severe rustiness; metal particles have been mostly stained by rust throughout.
E: Evaporite minerals visible to the naked eye.

"Fracturing" Categories:

A: Minor cracks; few or no cracks are conspicuous to the naked eye and no cracks penetrate the entire specimen.
B: Moderate cracks; several cracks extend across exterior surfaces and the specimen can be readily broken along the cracks.
C: Severe cracks; specimen readily crumbles along cracks that are both extensive and abundant.

The ~ indicates classification by optical methods. This can include macroscopic assignment to one of several well-characterized, large pairing groups (e.g., the QUE LL5 chondrites), as well as classification based on oil immersion of several olivine grains to determine the approximate index of refraction for grouping into H, L or LL chondrites. Petrologic types in this method are determined by the distinctiveness of chondrules boundaries on broken surfaces of a 1-3 g chip. While this technique is suitable for general characterization and delineation of equilibrated ordinary chondrites, those undertaking detailed study of any meteorite classified by optical methods alone should use caution. It is recommended that a polished thin section be requested to accompany any chip and appropriate steps for a more detailed characterization should be undertaken by the user. (Tim McCoy, Smithsonian Institution)

Table 3

Tentative Pairings for New Meteorites

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U.S. Antarctic collection should refer to the compilation provided by Dr. E.R. D. Scott, as published in issue 9(2) (June 1986). Possible pairings were updated in Meteoritical Bulletins No. 76 (Meteoritics 29, 100-143), No. 79 (Meteoritics and Planetary Science 31, A161-174), No. 82 (Meteoritics and Planetary Science 33, A221-A239), No. 83 (Meteoritics and Planetary Science 34, A169-A186), No. 84 (Meteoritics and Planetary Science 35, A199-A225), No. 85 (Meteoritics and Planetary Science 36, A293-A322), No. 86 (Meteoritics and Planetary Science 37, A157-A184), No. 87 (Meteoritics and Planetary Science 38, A189-A248), No. 88 (Meteoritics and Planetary Science 39, A215-272), No. 89 (Meteoritics and Planetary Science 40, A201-A263), No. 90 (Meteoritics and Planetary Science 41, 1383-1418), and No. 91(Meteoritics and Planetary Science, 42, in press).

ACHONDRITE UNGROUPED
GRA 06129 with GRA 06128
RBT 04255 with RBT 04239

CM2 CHONDRITES
LAP 04588, LAP 04675, LAP 04680, LAP 04760, LAP 04796, and LAP 04807 with LAP 04527

H CHONDRITE (IMPACT MELT)
LAP 04614 and LAP 04745 with LAP 02240

H5 CHONDRITE
LAP 04689 with LAP 04672

Petrographic Descriptions

Sample No.:	LAP 04462	Macroscopic Description: Kathleen McBride
Location:	LaPaz Ice Field	This ordinary chondrite has a dark brown exterior. It has a rusty black interior and a high metal content.
Field No.:	17335	
Dimensions (cm):	4.0 x 3.5 x 2.0	
Weight (g):	45.949	Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
Meteorite Type:	H Chondrite (Impact Melt)	The meteorite is an impact-melt rock of H chondrite composition (Fa_{18}, Fs_{16}) with a fine-grained silicate matrix, rounded metal-sulfide blebs and relict mineral grains.

Sample No.:	LAP 04475	Macroscopic Description: Kathleen McBride
Location:	LaPaz Ice Field	The exterior of this meteorite is dark brown/black with polygonal fractures. The interior is black and rusty with moderate amounts of metal and mm sized and smaller light colored inclusions/chondrules.
Field No.:	17099	
Dimensions (cm):	2.5 x 2.5 x 2.0	
Weight (g):	13.784	
Meteorite Type:	L3 Chondrite	Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach
		The section exhibits numerous closely-packed, well-defined chondrules of a range of sizes (up to 3 mm) in a black matrix of fine-grained silicates, metal and troilite. Modest shock effects and weathering are present. Silicates are unequilibrated; olivines range from Fa_{5-37} and pyroxenes from Fs_{12-22}. The meteorite is an L3 chondrite (estimated subtype 3.6).

Sample No.:	LAP 04514	Macroscopic Description: Kathleen McBride
Location :	LaPaz Ice Field	This carbonaceous chondrite has 40% purplish black fusion crust with polygonal fractures. The interior is a black powdery matrix with mm sized chondrules of various colors.
Field No.:	17698	
Dimensions (cm):	3.5 x 2.5 x 1.25	
Weight (g):	14.796	
Meteorite Type:	CM2 Chondrite	Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
		The section consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; metal and sulfide grains are present. Olivine compositions are Fa_{0-64}, orthopyroxene is Fs_1. The meteorite is a CM2 chondrite.

Sample No.:	LAP 04516	Macroscopic Description: Kathleen McBride
Location:	LaPaz Ice Field	The exterior is covered by 100% brown/black fusion crust with polygonal fractures. The interior is a dark brown to black matrix with large (>2 mm) chondrules of various colors.
Field No.:	17689	
Dimensions (cm):	3.5 x 2.5 x 1.5	
Weight (g):	26.258	
Meteorite Type:	CR2 Chondrite	Thin Section (,2) Description: Tim McCoy and Linda Welzenbach
		The section exhibits large (up to 3 mm), well-defined, metal-rich chondrules and CAI's in a dark, altered matrix. Rounded metal particles, likely chondrules, reach up to 0.5 mm. Silicates are unequilibrated; olivines range from Fa_{1-6} and pyroxenes from $Fs_{1-3}Wo_1$. The meteorite is a CR2 chondrite.

Sample No.:	LAP 04521	<u>Macroscopic Description: Kathleen McBride</u>
Location:	LaPaz Ice Field	75% brown/black fusion crust with oxidation haloes covers the exterior of this ordinary chondrite. The interior is a fine grained black to dark gray matrix.
Field No.:	17684	
Dimensions (cm):	2.5 x 1.5 x 1.5	
Weight (g):	7.136	
Meteorite Type:	H5 Chondrite	<u>Thin Section (,2) Description: Tim McCoy and Linda Welzenbach</u>
		The meteorite is an H5 chondrite (Fa_{19}, Fs_{17}) with a several mm wide shock vein with rounded blebs of metal and sulfide and moderately abundant clasts of single mineral grains. The unmelted host is severely shock blackened.

Sample No.:	LAP 04527; LAP 04588; LAP 04675; LAP 04680; LAP 04760; LAP 04796; LAP 04807	<u>Macroscopic Description: Kathleen McBride</u> The exteriors of these paired carbonaceous chondrites have varying amounts of fusion crust (40%-90%) and the colors range from purplish black to brown. The interiors are generally black with some oxidation, most have a powdery texture and contain chondrules of various colors. Varying degrees of oxidation exist in all these meteorites.
Location:	LaPaz Ice Field	<u>Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach</u>
FieldNo.:	17697;17473; 17629;17644; 17619; 17186; 17028	The meteorites are likely paired and a common description suffices. The sections consist of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{1-61}, orthopyroxene is Fs_{1-42}. The meteorites are CM2 chondrites.
Dimensions (cm):	1.5 x 1.5 x 0.75; 3.0 x 2.0 x 1.5; 2.5 x 2.0 x 1.5; 4.0 x 3.0 x 1.25; 1.0 x 1.0 x 1.0; 2.0 x 1.5 x 3.5; 3.0 x 2.5 x 2.0	
Weight (g):	1.964;10.984; 6.573;14.047; 1.119; 15.695; 11.590	
Meteorite Type:	CM2 Chondrite	

Sample No.:	LAP 04552	<u>Macroscopic Description: Kathleen McBride</u>
Location:	LaPaz Ice Field	The exterior has a dull black fractured fusion crust. The interior is a black matrix with evaporites and light colored chondrules.
Field No.:	17407	
Dimensions (cm):	2.0 x 2.0 x 1.5	
Weight (g):	11.417	<u>Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach</u>
Meteorite Type:	CM2 Chondrite	
		The section consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Chondrules are elongated as a result of flattening due to shock. Olivine compositions are Fa_{1-39}, orthopyroxene is Fs_{1-5}. The meteorite is a CM2 chondrite.

Sample No.:	LAP 04565	
Location:	LaPaz Ice Field	
Field No.:	17420	
Dimensions (cm):	3.0 x 1.5 x 1.0	
Weight (g):	7.066	
Meteorite Type:	CM2 Chondrite	

Macroscopic Description: Kathleen McBride

The exterior has a small purple black patch of fusion crust. The interior is a black powdery matrix with tiny tan and white chondrules

Thin Section (,2) Description: Tim McCoy and Lauren LaCroix and Linda Welzenbach

The section consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Alteration is prevalent within the chondrules. Olivine compositions are Fa_{1-56}, orthopyroxene is Fs_1. The meteorite is a CM2 chondrite.

Sample No.:	LAP 04572	
Location:	LaPaz Ice Field	
Field No.:	17313	
Dimensions (cm):	2.5 x 1.5 x 1.0	
Weight (g):	6.620	
Meteorite Type:	CK5 Chondrite	

Macroscopic Description: Kathleen McBride

85% of the exterior of this meteorite has dull black fusion crust. The interior is a medium gray matrix with <mm sized dark gray chondrules and is very hard.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section consists of poorly-defined chondrules up to 1 mm in a dark matrix of finer-grained silicates, sulfides and magnetite. Silicates are homogeneous. Olivine is Fa_{36} and orthopyroxene is Fs_{30}. The meteorite is a CK5 chondrite.

Sample No.:	LAP 04581	
Location:	LaPaz Ice Field	
Field No.:	17466	
Dimensions (cm):	3.0 x 2.0 x 1.5	
Weight (g):	16.021	
Meteorite Type:	LL5 Chondrite	

Macroscopic Description: Kathleen McBride

The exterior of this ordinary chondrite has 75% rusty black fusion crust with polygonal fractures. The interior is a gray matrix with gray chondrules and moderate metal.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The meteorite is an LL5 chondrite (Fa_{31}, Fs_{25}) with thin metal-sulfide, shock-melt veins.

Sample No.:	LAP 04592	
Location:	LaPaz Ice Field	
Field No.:	17458	
Dimensions (cm):	2.5 x 2.5 x 1.5	
Weight (g):	13.056	
Meteorite Type:	CR2 Chondrite	

Macroscopic Description: Kathleen McBride

The exterior is covered completely with brown thick fusion crust and polygonal fractures. The interior is black with an oxidation rind and rusty haloes. Some dark chondrules are visible.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The section exhibits medium, well-defined, metal-rich chondrules and CAI's in a dark, altered matrix that is particularly abundant. The section shows a prominent flattening and alignment, probably from shock. Silicates are unequilibrated; olivines range from Fa_{1-3} and pyroxenes from $Fs_{1-6}Wo_1$. The meteorite is a CR2 chondrite.

Sample No.:	LAP 04612
Location:	LaPaz Ice Field
Field No.:	17003
Dimensions (cm):	3.5 x 2.5 x 1.5
Weight (g):	22.433
Meteorite Type:	L3 Chondrite

Macroscopic Description: Kathleen McBride

90% of this ordinary chondrite's exterior has brown/black fusion crust with oxidation haloes. The interior is a gray matrix with high metal content and numerous gray and white chondrules.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section exhibits numerous large, well-defined chondrules (up to 3 mm) in a black matrix of fine-grained silicates, metal and troilite. Strong shock effects are present. The meteorite is moderately weathered. Silicates are unequilibrated; olivines range from Fa_{8-25}, with most grains Fa_{20-22}, and pyroxenes from Fs_{4-19}. The meteorite is an L3 chondrite (estimated subtype 3.8).

Sample No.:	LAP 04614; LAP 04745
Location:	LaPaz Ice Field
Field No.:	17004; 17443
Dimensions (cm):	2.0 x 1.5 x 1.5; 1.5 x 1.5 x 1.0
Weight (g):	5.653; 3.225
Meteorite Type:	H chondrite (Impact Melt)

Macroscopic Description: Kathleen McBride

The exteriors range from brown with fractures to brown with iridescent oxidation haloes. The rust colored, non-descript interiors are brittle and have a high metal content.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

These meteorites consist of a fine-grained, melt-textured matrix of olivine (Fa_{19}) and pyroxene (Fs_{17}) with irregular blebs of metal with rimming sulfide. They are H chondrite impact melts and likely paired with LAP 02240.

Sample No.:	LAP 04672; LAP 04689;
Location:	LaPaz Ice Field
Field No.:	17326; 17633
Dimensions (cm):	2.0 x 1.5 x 0.75; 2.0 x 2.0 x 1.5
Weight (g):	3.655; 11.242
Meteorite Type:	H5 Chondrite

Macroscopic Description: Kathleen McBride

The exteriors vary from brown/black to brown. The interiors are brittle rusty brown with high metal and fine grained dark gray matrix.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

These meteorites are melt-veined H5 chondrites (Fa_{19}, Fs_{17}) with veins of fine-grained shock melt with small blebs of metal and sulfide. A relationship with the LAP 02240 group is possible, if all of these meteorites represent different proportions of matrix and melt in an impact-melt breccia.

Sample No.:	LAP 04741
Location:	LaPaz Ice Field
Field No.:	17440
Dimensions (cm):	1.5 x 1.5 x 1.0
Weight (g):	3.215
Meteorite Type:	H5 Chondrite

Macroscopic Description: Kathleen McBride

The exterior of this ordinary chondrite is brown with fractures. The interior is a dark gray matrix.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The meteorite is an H5 chondrite (Fa_{19}, Fs_{17}) with thin shock-melt veins.

Sample No.:	LAP 04809
Location:	LaPaz Ice Field
Field No.:	17034
Dimensions (cm):	3.0 x 2.5 x 2.0
Weight (g):	15.835
Meteorite Type:	CM2 Chondrite

Macroscopic Description: Kathleen McBride

The exterior has <10% purplish black fusion crust. The interior is a black, powdery matrix with gray to white chondrules.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section consists of a few small, well-defined, unaltered chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{1-46}. The meteorite is a CM2 chondrite.

Sample No.:	LAP 04824
Location:	LaPaz Ice Field
Field No.:	17037
Dimensions (cm):	2.25 x 2.0 x 0.5
Weight (g):	1.706
Meteorite Type:	CM1 Chondrite

Macroscopic Description: Kathleen McBride

The exterior is black/brown with no fusion crust. The interior is a soft black matrix with mm sized light color inclusions.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section consists of a few small chondrules (up to 0.5 mm) that have been completely replaced by phyllosilicate set in an Fe-rich serpentine matrix. No isolated mineral grains or CAIs are apparent; sulfide grains are present. Unaltered olivine or pyroxene grains of sufficient size for microprobe analyses were not found. The meteorite is a highly altered CM1 chondrite.

Sample No.:	LAR 04364
Location:	Larkman Nunatak
Field No.:	15485
Dimensions (cm):	2.5 x 1.5 x 1.0
Weight (g):	5.823
Meteorite Type:	CV3 Chondrite

Macroscopic Description: Kathleen McBride

40% black fusion crust with polygonal fractures covers the exterior. The interior is a weathered black matrix with evaporites and gray chondrules.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section exhibits large chondrules (up to 3 mm) and CAIs in a dark matrix. Olivines range from Fa_{1-36}, with most Fa_{1-5}. The meteorite is an unequilibrated carbonaceous chondrite, probably a CV3.

Sample No.:	LAR 04369
Location:	Larkman Nunatak
Field No.:	15569
Dimensions (cm):	1.0 x 0.5 x 0.25
Weight (g):	0.635
Meteorite Type:	H Metal

Macroscopic Description: Kathleen McBride

This meteorite has no fusion crust and a rusty interior.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section, which measures 6 x 10 mm, consists of a single kamacite with an α_2 structure enclosing an ~1.5 x 3 mm clast of chondritic mineralogy. Within the clast, olivine is Fa_{19} and orthopyroxene is Fs_{17}. The meteorite is probably a metal particle from an H chondrite.

Sample No.:	LAR 04380	
Location:	Larkman Nunatak	
Field No.:	15593	
Dimensions (cm):	2.75 x 2.5 x 1.5	
Weight (g):	13.986	
Meteorite Type:	L3 Chondrite	

Macroscopic Description: Kathleen McBride

The exterior has 80% thin black fusion crust. The interior is a dark brown matrix with high metal content and contains <3 mm sized chondrules of various colors.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section exhibits numerous large, well-defined chondrules (up to 3 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. The meteorite is highly weathered. Silicates are unequilibrated; olivines range from Fa_{17-31}, with most grains Fa_{30-31}, and pyroxenes from Fs_{6-27}. The meteorite is an L3 chondrite (estimated subtype 3.9).

Sample No.:	LAR 04382
Location:	Larkman Nunatak
Field No.:	15597
Dimensions (cm):	4.5 x 1.75 x 3.0
Weight (g):	43.664
Meteorite Type:	H3 Chondrite

Macroscopic Description: Kathleen McBride

95% of the exterior is covered with dull brown/black fusion crust. The interior is a black matrix with numerous chondrules of various sizes and colors. This meteorite is hard.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section exhibits numerous small, well-defined chondrules (up to 1.2 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects and weathering are present. Silicates are unequilibrated; olivines range from Fa_{6-30} and pyroxenes from Fs_{1-13}. The meteorite is an H3 chondrite (estimated subtype 3.4).

Sample No.:	RBT 04143
Location:	Robert Massif
Field No.:	16244
Dimensions (cm):	4.0 x 3.5 x 3.0
Weight (g):	89.562
Meteorite Type:	CV3 Chondrite

Macroscopic Description: Kathleen McBride

50% striated rusty brown to black rough fusion crust covers the exterior. The interior is a black matrix with high metal content and is hard. It has chondrules and clasts of various colors.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section exhibits large chondrules (up to 2 mm) and CAIs in a dark matrix. Olivines range from Fa_{1-69}, with most Fa_{1-2}, pyroxene is Fs_{1-3}. The meteorite is an unequilibrated carbonaceous chondrite, probably a CV3.

Sample No.:	RBT 04251
Location:	Roberts Massif
Field No.:	16304
Dimensions (cm):	2.0 x 2.0 x 1.5
Weight (g):	19.542
Meteorite Type:	H3 Chondrite

Macroscopic Description: Kathleen McBride

100% of the exterior is covered by brown/black fusion crust with oxidation haloes. The interior is a rusty black matrix with gray chondrules and a high metal content.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section exhibits numerous well-defined chondrules of a range of sizes (up to 2.6 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects and weathering are present. Silicates are unequilibrated; olivines range from Fa_{1-20} and pyroxenes from Fs_{1-6}. The meteorite is an H3 chondrite (estimated subtype 3.4).

Sample No.:	RBT 04255
Location:	Roberts Massif
Field No.:	16342
Dimensions (cm):	2.5 x 2.0 x 1.0
Weight (g):	10.170
Meteorite Type:	Achondrite Ungrouped

Macroscopic Description: Kathleen McBride

90% thick brown/black fusion crust covers the exterior surface. The interior is a rusty black matrix with metal and is hard.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The meteorite is paired with RBT 04239, which was described as follows: The section consists of an olivine-rich groundmass with pyroxene, plagioclase, metal and troilite present. Micron-sized metal-sulfide veinlets are abundant and a few relict chondrules are present. Olivine is Fa_{24}, orthopyroxene is $Fs_{20}Wo_2$, clinopyroxene is Fs_8Wo_{44} and plagioclase is $An_{10}Or_5$. The meteorite may be an ungrouped primitive achondrite and has some similarities to the Divnoe meteorite (Petaev et al., Meteoritics, 29, 182).

Sample No.:	MIL 05069
Location:	Miller Range
Field No.:	18158
Dimensions (cm):	4.3 x 3.4 x 3.0
Weight (g):	76.452
Meteorite Type:	EH3 Chondrite

Macroscopic Description: Cecilia Satterwhite

The exterior is dull brown/black with rusty areas. The interior is a rusty brown/black.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section shows an aggregate of chondrules (up to 2.5 mm), chondrule fragments, and pyroxene grains in a matrix rich in metal and sulfide. Chondrules contain moderate to small abundances of olivine. Microprobe analyses show the olivine is Fa_{0-1} and pyroxene is Fs_{0-2}. The meteorite is a type 3 enstatite chondrite, probably an EH3.

Sample No.:	MIL 05147
Location:	Miller Range
Field No.:	18074
Dimensions (cm):	1.5 x 1.25 x 0.75
Weight (g):	4.850
Meteorite Type:	Iron-IIIAB

Macroscopic Description: Tim McCoy

This small (1.5 x 1.25 x 0.75 mm; 4.85 grams) sample exhibits a bluish-silver exterior reminiscent of both fusion crusted iron (e.g., San Francisco Mts.) and irons which have had the exterior removed as a result of ablation by sand or ice. Numerous large cracks are present and the meteorite has obviously split along one of these fractures, producing a planar boundary which abuts a jagged surface and together which form an indentation into an otherwise rounded specimen.

Thin Section (,2) Description: Tim McCoy

The longitudinal section measures ~7 x 7 mm. One end of the section is rounded and represents the original surface of the meteorite. The opposite end is truncated along a linear edge. The bulk of the meteorite is composed of kamacite with an α_2 structure. The section is bounded by a weathered crust that rarely overlies small pockets of fusion crust. Inset from the straight edge of the section and parallel to it at regular spacings of ~2 mm are, first, a taenite lamellae (up to 34 wt.% Ni) ~50 μm in width which contain along its length irregular ~100 μm pockets of taenite and P-rich, Ni-rich melt (28 wt.% Ni, 11 wt.% P) in a eutectic relationship. A further ~2 mm into the meteorite is a fracture, now filled with terrestrial iron hydroxides, that includes larger grains of taenite (up to 23 wt.% Ni). The larger particles, reaching a few hundreds microns, sometimes contain oriented kamacite plates. A representative traverse yields an average composition of 7.2 wt.% Ni, 0.1 wt.% P and 0.6 wt.% Co. The meteorite is an iron and could be related to a number of groups (e.g., IIAB, IIIAB, IAB). The Ni and P concentrations might suggest group IIIAB. It is, however, unlikely that it is representative of the larger mass from which it was derived.

Sample No.:	TYR 05181	
Location:	Taylor Glacier	
Field No.:	17359	
Dimensions (cm):	8.0 x 4.5 x 4.5	
Weight (g):	544.1	
Meteorite Type:	Iron-IIE	

Macroscopic Description: Tim McCoy

The meteorite is a somewhat irregularly shaped mass of ~8 x 4.5 x 4.5 cm. One surface is relatively smooth, with small (1-2 mm) pits and large (1-2 cm), shallow depressions that may be regmaglypts. The opposite surface is highly-irregular in shape, with planar surfaces, larger (~5 mm) deep pits, and linear depressions that can reach a few cm in length and a few mm in width and depth.

Thin Section (,2) Description: Tim McCoy

A longitudinal slice measuring ~3 x 3.5 cm was examined prior to thin section preparation. The slice exhibits a prominent reheated α_2 structure around the entire margin, reaching to a depth of up to 5 mm. The section includes inclusions of rounded to elongate troilite (up to 2 x 10 mm), sometimes occurring with silicates, as well as silicate-dominated inclusions, the largest of which reaches 7 mm in diameter and is truncated by the surface. Inclusions are rimmed by swathing kamacite, set inside a Widmanstätten pattern indicative of formation from a single austenite crystal and with kamacite bandwidths of ~1 mm. Examination of the polished thin section reveals that the polymineralic inclusions consist of orthopyroxene ($Fs_{19}Wo_1$), augite ($Fs_{8-11}Wo_{32-42}$), potassium feldspar ($An_{0-3}Or_{25-58}$), phosphate (probably whitlockite), chromite and troilite. The inclusion mineralogy does not exactly match other known meteorites, but is similar to IIE irons such as Miles. No fusion crust is present and a weathered zone ~100 μm thick overlies a reheated zone reaching to 0.5 mm depth. The meteorite is dominated by short, wide (~0.8 mm) kamacite lamellae with rectangular and triangular plessite fields. A microprobe traverse yields an average composition of 8.3 wt.% Ni, 0.04 wt.% P and 0.54 wt.% Co. The Ni concentration is similar to other IIE irons (e.g., Kodaikanal). The meteorite is an iron, probably from group IIE.

Sample No.:	DNG 06004	
Location:	D'Angelo Bluff	
Field No.:	17787	
Dimensions (cm):	4.2 x 4.0 x 2.0	
Weight (g):	47.437	
Meteorite Type:	CM2 Chondrite	

Macroscopic Description: Cecilia Satterwhite

This carbonaceous chondrite has 75% fractured, black fusion crust. The exterior surface is vesicular and pitted, some areas are frothy. Areas without fusion crust are black with tiny white/gray specks. The interior is a dark gray to black fine-grained matrix with abundant small white/cream colored inclusions/chondrules.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The section consists of small, minimally-altered chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; metal and sulfide grains are present. Olivine compositions are Fa_{1-44}, orthopyroxene is Fs_3. The meteorite is a CM2 chondrite.

Sample No.:	GRA 06100	
Location:	Graves Nunataks	
Field No.:	17902	
Dimensions (cm):	6.0 x 5.5 x 5.0	
Weight (g):	421.75	
Meteorite Type:	CR2 Chondrite	

Macroscopic Description: Cecilia Satterwhite

The exterior has 60% black fusion crust with some rusty spots and chondrules/inclusions visible. Areas without fusion crust are dark gray with a coarse grained texture. The interior is gray with small inclusions/chondrules of various colors, white, cream and gray. Some areas are rusty.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The section exhibits large (up to 3 mm), well-defined, metal-rich chondrules and CAI's in a dark matrix. Rounded metal particles, likely chondrules, reach up to 1 mm. Silicates are unequilibrated; olivines range from Fa_{1-15} and pyroxenes from $Fs_{1-3}Wo_{1-3}$. The meteorite is a CR2 chondrite.

Sample No.:	GRA 06101
Location:	Graves Nunataks
Field No.:	17932
Dimensions (cm):	19.5 x 14 x 9
Weight (g):	3555.0
Meteorite Type:	CV3 Chondrite

Macroscopic Description: Cecilia Satterwhite

40% pitted and fractured black fusion crust covers the exterior. Areas without fusion crust are gray with a coarse grained texture. Some rusty areas and abundant light colored inclusions/chondrules are visible. The interior is a coarse grained gray matrix with abundant white and gray inclusions/chondrules. Some areas are weathered and rusty.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The section exhibits large chondrules (up to 3 mm) and CAIs in a dark matrix. Olivines range from Fa_{1-23} and pyroxenes from Fs_{0-1}. The meteorite is an unequilibrated carbonaceous chondrite, probably a CV3.

Sample No.:	GRA 06128; GRA 06129
Location:	Graves Nunataks
Field No.:	17918; 17713
Dimensions (cm):	8.5 x 4.0 x 7.5 8.0 x 5.0 x 2.5
Weight (g):	447.6; 196.450
Meteorite Type:	Achondrite Ungrouped

Macroscopic Description: Kathleen McBride

50% of the exteriors have shiny to glassy patches of black fusion crust. The exposed interior is rusty yellow in color and has fractures in a sort of plate like orientation. The interior has small areas of gray crystalline material. It is a rusty to yellow-ocher color and very weathered.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach, Glenn MacPherson and Lauren LaCroix

The sections exhibit a granoblastic texture dominated by sodic plagioclase (>70 vol. % in the section studied) with lesser olivine and two pyroxenes, although mafic-rich pockets reaching several mm in size are present. Grain size is very heterogeneous; in one large feldspathic region the crystals are up to 5 mm, but elsewhere are rarely as large as 1 mm, perhaps suggesting formation as a breccia. Minor opaques include ilmenite (1.6% MgO), troilite, Fe,Ni-sulfide (pentlandite; 26% Ni), spinel (13% TiO_2, 35% Cr_2O_3, 3% Al_2O_3), and Ni-Fe metal (67% Ni) that occurs only as minute inclusions inside of olivine. Silicates are equilibrated with olivine of Fa_{59}, orthopyroxene of $Fs_{44}Wo_2$ (Fe/Mn~43), clinopyroxene of $Fs_{19}Wo_{43}$ (Fe/Mn~30-45) and oligoclase ($An_{14}Or_2$). The combination of its variable grain size, locally granoblastic texture, iron-rich mafics and sodium-rich plagioclase is unlike any known achondrite, including those of planetary origin.

Oxygen isotopic analysis: Z. Sharp, University of New Mexico

Oxygen isotopic analyses of three small (2-5 mg) pieces yielded the following results which fall in the Earth, Moon and enstatite meteorite field:

$\delta^{17}O = 3.04$, $\delta^{18}O = 6.01$, $\Delta^{17}O = -0.09$
$\delta^{17}O = 2.89$, $\delta^{18}O = 5.63$, $\Delta^{17}O = -0.03$
$\delta^{17}O = 3.05$, $\delta^{18}O = 6.01$, $\Delta^{17}O = -0.07$
[where $\Delta^{17}O = \delta^{17}O - 0.52 \times \delta^{18}O$]

Sample No.:	GRA 06130
Location:	Graves Nunataks
Field No.:	17935
Dimensions (cm):	4.0 x 3.0 x 2.25
Weight (g):	13.639
Meteorite Type:	CV3 Chondrite

Macroscopic Description: Kathleen McBride

Fusion crust covers 10% of the exterior which has a ropy, purplish black color. The interior is a black matrix with gray and white chondrules/clasts.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The section exhibits large chondrules (up to 3 mm) and CAIs in a dark matrix. Olivines range from Fa_{1-32} and pyroxenes from Fs_{0-2}. The meteorite is an unequilibrated carbonaceous chondrite, probably a CV3.

Sample No.:	GRA 06131	<u>Macroscopic Description: Kathleen McBride</u> The exterior is brown/black with fractures. The interior is black and charcoal gray with an oxidation rind. <u>Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach</u> The section consists of a few small chondrules (up to 0.5 mm), mineral grains and CAIs set in an extensively-altered, black matrix. Metal and sulfide grains are present. Olivine compositions are Fa_{1-23}. The meteorite is a CM2 chondrite.
Location:	Graves Nunataks	
Field No.:	18052	
Dimensions (cm):	2.5 x 1.5 x 2.0	
Weight (g):	7.273	
Meteorite Type:	CM2 Chondrite	

Sample No.:	GRA 06157	<u>Macroscopic Description: Kathleen McBride</u> The exterior has no fusion crust and is a gray color with white and cream colored clasts. The interior is a gray matrix with white clasts throughout. <u>Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach</u> The section shows a groundmass of comminuted pyroxene, olivine and plagioclase with grain sizes up to 1 mm. One-half of the section exhibits a darkened matrix. Olivine is Fa_{7-54}, pyroxene ranges from $Fs_{19-66}Wo_{2-45}$ (Fe/Mn ~ 60), and plagioclase An_{94-97}. The meteorite is lunar, probably an anorthositic regolith breccia.
Location:	Graves Nunataks	
Field No.:	17724	
Dimensions (cm):	1.0 x 1.0 x 0.5	
Weight (g):	0.788	
Meteorite Type:	Lunar-Anorth. Breccia	

Sample No.:	GRA 06172	<u>Macroscopic Description: Kathleen McBride</u> 50% purplish black fusion crust with polygonal fractures covers the exterior. The exposed interior has a vesicular texture. The interior is a black matrix with light color chondrules <mm in size and some rusty patches. <u>Thin Section (,2) Description: Tim McCoy and Linda Welzenbach</u> The section consists of a numerous minimally-altered chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{1-44}, orthopyroxene is Fs_3. The meteorite is a CM2 chondrite.
Location:	Graves Nunataks	
Field No.:	17772	
Dimensions (cm):	3.5 x 2.5 x 2.0	
Weight (g):	21.069	
Meteorite Type:	CM2 Chondrite	

Sample No.:	GRA 06173	<u>Macroscopic Description: Kathleen McBride</u> 100% shiny, black fusion crust with polygonal fractures covers the exterior. The interior is a gray matrix with gray chondrules. <u>Thin Section (,2) Description: Tim McCoy and Linda Welzenbach</u> The section consists of large (up to 2 mm), well-defined chondrules in a matrix of finer-grained silicates, sulfides and magnetite. The meteorite is a little weathered, but extensively shock blackened. Silicates are homogeneous. Olivine is Fa_{31}. Plagioclase is An_{36-63}. The meteorite appears to be a CK4 chondrite.
Location:	Graves Nunataks	
Field No.:	17756	
Dimensions (cm):	1.0 x 1.0 x 2.0	
Weight (g):	5.505	
Meteorite Type:	CK4 Chondrite	

Sample No.:	GRA 06189	<u>Macroscopic Description: Kathleen McBride</u> Shiny black fusion crust with fine “wrinkles” covers the exterior of this achondrite. The interior matrix ranges from dark to light gray with patches of yellow brown areas. <u>Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach</u> The section consists of a coarse-grained unbrecciated gabbro composed of pyroxene and plagioclase with grain sizes reaching 3 mm. Shock effects are pervasive, including mosaicism in both pyroxene and plagioclase. Silicates are homogeneous with orthopyroxene of $Fs_{60}Wo_2$, clinopyroxene of $Fs_{26}Wo_{43}$ (Fe/Mn~30) and plagioclase of An_{90}. The meteorite is an unbrecciated eucrite.
Location:	Graves Nunataks	
Field No.:	17753	
Dimensions (cm):	1.5 x 1.5 x 1.0	
Weight (g):	2.941	
Meteorite Type:	Eucrite (Unbrecciated)	

Sample No.:	LAR 06319
Location:	Larkman Nunatak
Field No.:	19318
Dimensions (cm):	5.5 x 3.5 x 2.5
Weight (g):	78.572
Meteorite Type:	Shergottite

Macroscopic Description: Kathleen McBride

The exterior has 60% dark brown to black fusion crust with a very fine grained wrinkled texture. The fusion crust exhibits a slight sheen. The interior is a gray and black matrix that is fine grained and very hard.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section is composed of a coarse-grained assemblage of pyroxene, olivine and maskelynite. Olivine occurs as phenocrysts with grain sizes up to 2.5 mm. Pyroxene and maskelynite in the matrix are finer grained, typically reaching 0.5 mm. Sulfides and oxides are present, as are shock melt veins. Olivine is Fa_{25-48}; pyroxenes exhibit a range of compositions from pigeonite to subcalcic augite ($Fs_{25-51}Wo_{5-31}$; Fe/Mn ~ 23-35); feldspar is intermediate in composition (An_{46-52}). The meteorite is an olivine-phyric shergottite.

Oxygen isotopic analysis: Z. Sharp, University of New Mexico

Oxygen isotopic analyses of two small (2-5 mg) pieces yielded the following results which fall in the martian meteorite field:

$\delta^{17}O = 2.85, \delta^{18}O = 4.85, \Delta^{17}O = 0.33$

$\delta^{17}O = 2.83, \delta^{18}O = 4.92, \Delta^{17}O = 0.27$

[where $\Delta^{17}O = \delta^{17}O - 0.52 \times \delta^{18}O$]

Sample No.:	LAR 06621
Location:	Larkman Nunatak
Field No.:	19339
Dimensions (cm):	3.5 x 3.0 x 1.5
Weight (g):	20.235
Meteorite Type:	Howardite

Macroscopic Description: Kathleen McBride

Rough brown/black fusion crust covers 50% of the exterior. The matrix is a tannish gray color with <mm sized black, white and brown inclusions. A few vugs are present.

Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The section shows a groundmass of comminuted pyroxene and plagioclase (up to 0.5 mm) with fine- to coarse-grained basaltic clasts ranging up to 3 mm. Impact melt clasts are 1-2 mm and occur in some abundance. Pyroxene varies widely in composition with iron-rich pyroxenes ranging between $Fs_{60}Wo_3$ and $Fs_{27}Wo_{43}$. Iron-poor pyroxenes are $Fs_{19}Wo_1$. Pyroxene has an Fe/Mn ratio of ~30. Plagioclase is $An_{84-93}Or_{0.3}$. The meteorite is a howardite.

Sample No.:	LAR 06638
Location:	Larkman Nunatak
Field No.:	19362
Dimensions (cm):	2.5 x 2.0 x 0.75
Weight (g):	5.393
Meteorite Type:	Lunar-Anorth. Breccia

Macroscopic Description: Kathleen McBride

The bottom exterior surface has black fusion crust, while the top has a lighter brown crust. Polygonal fractures are present. The gray and white matrix has a sharp line where matrix becomes black with white inclusions.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section shows a groundmass of comminuted pyroxene, olivine and plagioclase with grain sizes up to 1 mm. Clasts up to 2 mm include basalts, granulites and anorthosites. One-half of the section exhibits a darkened matrix. Olivine is Fa_{28-33}, pyroxene ranges from $Fs_{27-39}Wo_{3-12}$ (Fe/Mn ~ 60), and plagioclase An_{93-98}. The meteorite is lunar, probably an anorthositic regolith breccia.

Sample No.:	LAR 06870	Macroscopic Description: Kathleen McBride
Location:	Larkman Nunatak	95% black fusion crust covers the exterior, which is dull on one surface and shiny on the other. The interior is a gray and white matrix with a powdery texture.
Field No.:	19944	
Dimensions (cm):	2.5 x 1.75 x 2.0	
Weight (g):	15.43	
Meteorite Type:	Eucrite (Brecciated)	Thin Section (,2) Description: Tim McCoy and Linda Welzenbach

The meteorite is a breccia that has been metamorphosed and shocked. Basaltic clasts measuring from 0.5-4 mm vary widely in texture and grain size (0.1-1 mm), reflecting their variable cooling histories, and boundaries between clasts and matrix have been largely obscured by later metamorphism. Pyroxenes are exsolved and pervasive shock effects include mosaicism in pyroxene. Mineral compositions are nearly homogeneous with orthopyroxene ($Fs_{60}Wo_2$), augite ($Fs_{30}Wo_{39}$), and plagioclase ($An_{78-86}Or_1$). The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a brecciated eucrite.

Sample No.:	LAR 06875	Macroscopic Description: Kathleen McBride
Location:	Larkman Nunatak	Black and dark gray patches of various sizes of what appears to be fusion crust is present on the exterior. The dull, marbled appearing interior consists of cream and dark gray materials. Individual clasts are not distinct. Fines are rather powdery and weathered.
Field No.:	19328	
Dimensions (cm):	6.0 x 5.5 x 3.0	
Weight (g):	165.797	
Meteorite Type:	Eucrite (Brecciated)	Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

This meteorite is dominated by fine-grained (~100 micron average grain size) basaltic material which occurs as both the host and clasts within this meteorite. In parts, the section has a cataclastic, rather than brecciated, appearance. Occasional coarser-grained clasts (grain sizes up to 0.2 mm) are observed. Mineral compositions are homogeneous with orthopyroxene ($Fs_{61}Wo_2$), augite ($Fs_{27}Wo_{43}$), and plagioclase ($An_{86}Or_{0.5}$). The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a brecciated eucrite.

Sample No.:	LAR 06876	Macroscopic Description: Tim McCoy
Location:	Larkman Nunatak	The meteorite is a somewhat irregularly shaped mass of ~8 x 5.5 x 3.5 cm. One surface is relatively smooth, with numerous small (1-2 mm) pits and large (1-2 cm) and occasional larger (~5 mm diameter), shallow pits. The opposite surface is highly-irregular in shape, with larger (~5 mm) deep pits.
Field No.:	19352	
Dimensions (cm):	8.0 x 5.5 x 3.5	
Weight (g):	475.3	
Meteorite Type:	Iron-IAB	

Thin Section (,2) Description: Tim McCoy

A longitudinal slice measuring ~5 x 2.5 cm was examined prior to thin section preparation. The slice exhibits a prominent reheated α_2 structure around the entire margin, reaching to a depth of up to 3 mm. The section includes inclusions of troilite, silicates, and likely graphite that reach up to 1.5 cm in maximum dimension. The meteorite exhibits a Widmanstätten pattern indicative of formation from a single austenite crystal and with kamacite bandwidths of ~1.5-2 mm. Examination of the polished thin section reveals polymineralic inclusions of olivine (Fa_5), low-Ca pyroxene (Fs_6), high-Ca pyroxene (Fs_3), plagioclase, metal, troilite, graphite, schreibersite and rare chromite. No fusion crust or heat-altered zone was present. The metallic host contains poorly-defined, short kamacite lamellae that exceed 0.5 mm in width. A microprobe traverse revealed an average composition of 7.8 wt.% Ni, 0.06 wt.% P and 0.57 wt.% Co. The low P value likely reflects the exsolution of schreibersite. The meteorite in an iron, probably of group IAB.

Sample No.:	LAR 06877
Location:	Larkman Nunatak
Field No.:	19048
Dimensions (cm):	7.0 x 6.0 x 3.0
Weight (g):	588.2
Meteorite Type:	Iron-IIIAB

Macroscopic Description: Tim McCoy

The meteorite has a brown surface indicative of oxidation. It exhibits a strongly convex upper surface typical of flight oriented specimens. On one end of the meteorite, the upper surface contacts a planar lower surface along a distinct terminal ridge. This planar lower surface measures ~5 x 3 cm and terminates along an irregular boundary. The remainder of the lower surface appears to be a later fracture surface, although that fracture likely occurred in the atmosphere judging from the smoothed nature and oxidized surface. On both the upper and lower broken surface, sets of parallel lines are observed, almost certainly reflecting the Widmanstätten pattern of this meteorite.

Thin Section (,2) Description: Tim McCoy

A longitudinal, lenticular-shaped slice measuring ~6 x 2.5 cm was examined prior to thin section preparation. The meteorite exhibits a continuous Widmanstätten pattern with long, thin (~0.5 mm width) kamacite lamellae. In polished section, the convex upper surface is observed to be bounded by a 100-200 μm fusion crust. A reheated α_2 structure penetrates ~1 mm around the entire periphery of the sample. Kamacite lamellae range between ~300 and 500 μm in width and triangular to rectangular plessite fields reach 2 mm in width. A single 2 mm troilite inclusion contains an ~100 μm chromite grain and is bounded by a similarly-sized schreibersite. A microprobe traverse across the section yielded 8.7 wt% Ni, 0.17 wt.% P and 0.51 wt.% Co, within the range for IIIAB irons (Yang and Goldstein, 2005, MAPS 40, 239). The meteorite is an iron, probably of group IIIAB.

Sample No.:	SCO 06040
Location:	Scott Glacier
Field No.:	17705
Dimensions (cm):	5.5 x 4.5 x 2.0
Weight (g):	60.162
Meteorite Type:	Howardite

Macroscopic Description: Kathleen McBride

50% of the exterior surface has shiny black fusion crust. The gray matrix has angular clasts of various sizes and colors.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The meteorite is a breccia of basaltic clasts, orthopyroxene grains, and coarse-grained orthopyroxenites in a comminuted matrix. Clasts reach up to 1 mm. Carbonaceous chondrite (presumably CM2) clasts up to 2 mm are present. Pyroxene compositions range over $Fs_{19-65}Wo_{2-44}$ (Fe/Mn~23-37). Plagioclase is $An_{88-94}Or_1$. Within the carbonaceous clasts, olivine is Fa_{0-1} and pyroxene is Fs_7. The meteorite is a howardite.

Sample No.:	SCO 06041
Location:	Scott Glacier
Field No.:	17702
Dimensions (cm):	5.0 x 3.0 x 2.0
Weight (g):	45.154
Meteorite Type:	Eucrite (Brecciated)

Macroscopic Description: Kathleen McBride

100% black, glassy fusion crust covers the exterior surface. The interior is a light gray matrix with darker gray clasts. Smaller inclusions of white, black and various shades of gray are visible.

Thin Section (,2) Description: Tim McCoy, Lauren LaCroix and Linda Welzenbach

The section consists of rare coarse-grained basaltic clasts up to 2 mm in a comminuted matrix of plagioclase and pyroxene. Pyroxene is commonly twinned with orthopyroxene ($Fs_{49}Wo_2$) containing lamellae of augite ($Fs_{19}Wo_{45}$). Fe/Mn in pyroxene is ~30. Plagioclase is An_{82-90}. The meteorite is a brecciated eucrite.

Sample Request Guidelines

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. Graduate student requests should have a supervising scientist listed to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. Sample requests that do not meet the curatorial allocation guidelines will be reviewed by the Meteorite Working Group (MWG). Issuance of samples does not imply a commitment by any agency to fund the proposed research. Requests for financial support must be submitted separately to an appropriate funding agency. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation, and all allocations are subject to recall.

Samples can be requested from any meteorite that has been made available through announcement in any issue of the ***Antarctic Meteorite Newsletter*** (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in five *Smithsonian Contributions to the Earth Sciences*: Nos. 23, 24, 26, 28, and 30. Tables containing all classified meteorites (as of August 2006 have been published in the Meteoritical Bulletins 76, 79, and 82-90 available in the following volumes and pages of *Meteoritics* and *Meteoritics and Planetary Science*: 29, p. 100-143; 31, A161-A174; 33, A221-A240; 34, A169-A186; 35, A199-A225; 36, A293-A322; 37, A157-A184; 38, A189-A248; 39, A215-A272; 40, A201-263; 41,1383-1418; 42, in press. They are also available online at:

http://www.meteoriticalsociety.org/simple_template.cfm?code=pub_bulletin

The most current listing is found online at:

http://curator.jsc.nasa.gov/curator/antmet/us_clctn.htm

All sample requests should be made electronically using the form at:

http://curator.jsc.nasa.gov/curator/antmet/samreq.htm

The purpose of the sample request form is to obtain all information MWG needs prior to their deliberations to make an informed decision on the request. Please use this form if possible.

The preferred method of request transmittal is via e-mail. Please send requests and attachments to:

cecilia.e.satterwhite@nasa.gov

Type **MWG Request** in the e-mail subject line. Please note that the form has signature blocks. The signature blocks should only be used if the form is sent via Fax or mail.

Each request should accurately refer to meteorite samples by their respective identification numbers and should provide detailed scientific justification for proposed research. Specific requirements for samples, such as sizes or weights, particular locations (if applicable) within individual specimens, or special handling or shipping procedures should be explained in each request. Some meteorites are small, of rare type, or are considered special because of unusual properties. Therefore, it is very important that all requests specify both the optimum amount of material needed for the study and the minimum amount of material that can be used. Requests for thin sections that will be used in destructive procedures such as ion probe, laser ablation, etch, or repolishing must be stated explicitly.

Consortium requests should list the members in the consortium. All necessary information should be typed on the electronic form, although informative attachments (reprints of publication that explain rationale, flow diagrams for analyses, etc.) are welcome.

The Meteorite Working Group (MWG), is a peer-review committee which meets twice a year to guide the collection, curation, allocation, and distribution of the U.S. collection of Antarctic meteorites. The deadline for submitting a request is 2 weeks prior to the scheduled meeting.

Requests that are received by the MWG secretary by **September 14, 2007** deadline will be reviewed at the MWG meeting **October 1-2, 2007** in Washington, D.C. Requests that are received after the deadline may be delayed for review until MWG meets again in the Spring of 2008. **Please submit your requests on time.** Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax or phone.

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Meteorites On-Line

Several meteorite web site are available to provide information on meteorites from Antarctica and elsewhere in the world. Some specialize in information on martian meteorites and on possible life on Mars. Here is a general listing of ones we have found. We have not included sites focused on selling meteorites even though some of them have general information. Please contribute information on other sites so we can update the list.

JSC Curator, Antarctic meteorites	http://www-curator.jsc.nasa.gov/antmet/index.cfm
JSC Curator, martian meteorites	http://www-curator.jsc.nasa.gov/antmet/marsmets/index.cfm
JSC Curator, Mars Meteorite Compendium	http://www-curator.jsc.nasa.gov/antmet/mmc/index.cfm
Antarctic collection	http://geology.cwru.edu/~ansmet/
Smithsonian Institution	http://www.minerals.si.edu/
LPI martian meteorites	http://www.lpi.usra.edu
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
Museo Nazionale dell'Antartide	http://www.mna.it/english/Collections/collezioni_set.htm
BMNH general meteorites	http://www.nhm.ac.uk/research-curation/departments/mineralogy/research-groups/meteoritics/index.html
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://meteoritics.org/
Meteorite! Magazine	http://homepages.ihug.co.nz/~afs/index.html
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://epsc.wustl.edu/admin/resources/moon_meteorites.html
Washington Univ. "meteor-wrong"	http://epsc.wustl.edu/admin/resources/meteorites/meteorwrongs/meteorwrongs.htm

Other Websites of Interest

Mars Exploration	http://mars.jpl.nasa.gov
Rovers	http://marsrovers.jpl.nasa.gov/home/index.html
Near Earth Asteroid Rendezvous	http://near.jhuapl.edu/
Stardust Mission	http://stardust.jpl.nasa.gov
Genesis Mission	http://genesismission.jpl.nasa.gov
ARES	http://ares.jsc.nasa.gov/