

Antarctic Meteorite Newsletter

Volume 23, Number 2

September 2000



Program News

Marilyn Lindstrom

New Meteorites

This newsletter contains classifications of 626 meteorites from the 1997-1999 ANSMET collections. Descriptions are given for seventeen meteorites of special petrologic type. These include eight chondrites (four type 3 ordinary chondrites, three carbonaceous chondrites, and one enstatite chondrite), eight achondrites (five HED, one ureilite and the best of the lot, two Brachinites) and one nice, large iron.

The classifications also include all eight meteorites (EET99400-407) collected by the Carnegie Mellon NOMAD rover in the Elephant Moraine area. All of the NOMAD samples are meteorites and they are more



NOMAD and field team

than half achondrites, suggesting that we may have biased their data by giving them too many achondrites for calibration. John Schutt also collected several more samples from the area while waiting for NOMAD to do its work and these will be announced in the next newsletter.

JSC Lab Renovations

Work continues on upgrading our facilities. Last year it was replacing the roof, and now it's the air handlers in the Meteorite Processing Lab (MPL). We currently have 2-30 year old units operating in serial. The outside handler has rusted out, but the inside primary one is still working. We are planning on replacing both units and adding HEPA filtration as an upgrade. We will also have the ducts cleaned.

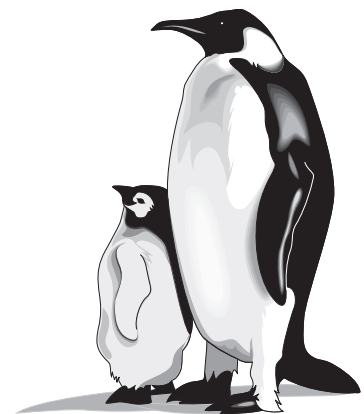
continued on page 2

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

Edited by Cecilia Satterwhite and Marilyn Lindstrom, Code SN2, NASA Johnson Space Center, Houston, Texas 77058

Inside this Issue

Program News	1
New Meteorites	3
Location Abbreviations and Map	3
Table 1: Alpha List of New Meteorites	4
Notes to Tables 1 & 2	14
Table 2: Newly Classified Specimens	13
Table 3: Tentative Pairings	14
Petrographic Descriptions	15
Table 4: NTL Data for Antarctic Meteorites	21
Sample Request Guidelines	23
Antarctic Meteorite Laboratory Contacts	23
Meteorites On-Line	24



**Sample Request Deadline
October 6, 2000**

**MWG Meets
October 20-21, 2000**

New Meteorites

From 1997-1999 Collection

Pages 4-20 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 23(1), Feb. 2000. 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:

Kathleen McBride, Cecilia Satterwhite
Antarctic Meteorite Laboratory
NASA Johnson Space Center
Houston, Texas

Brian Mason, Tim McCoy, and Linda Welzenbach
Department of Mineral Sciences
U.S. National Museum of Natural History
Smithsonian Institution
Washington, D.C.

Antarctic Meteorite Locations

ALH — Allan Hills
BEC — Beckett Nunatak
BOW — Bowden Neve
BTN — Bates Nunataks
DAV — David Glacier
DEW — Mt. DeWitt
DOM — Dominion Range
DRP — Derrick Peak
EET — Elephant Moraine
GEO — Geologists Range
GDR — Gardner Ridge
GRA — Graves Nunataks
GRO — Grosvenor Mountains
HOW — Mt. Howe
ILD — Inland Forts
KLE — Klein Ice Field
LAP — LaPaz Ice Field
LEW — Lewis Cliff
LON — Lonewolf Nunataks
MAC — MacAlpine Hills
MBR — Mount Baldur
MCY — MacKay Glacier
MET — Meteorite Hills
MIL — Miller Range
OTT — Outpost Nunatak
PAT — Patuxent Range
PCA — Pecora Escarpment
PGP — Purgatory Peak
PRE — Mt. Prestrud
QUE — Queen Alexandra Range

RKP — Reckling Peak
SCO — Scott Glacier
STE — Stewart Hills
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

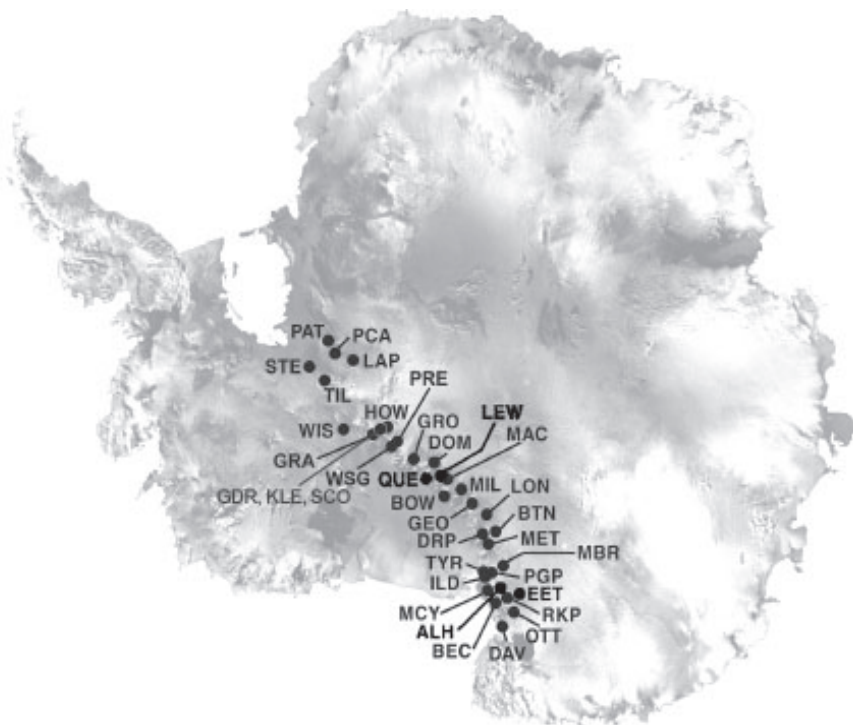


Table 1: List of Newly Classified Antarctic Meteorites**

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
ALH 97 100 ~	342.8	L6 CHONDRITE	B	B/C		
ALH 97 101 ~	222.4	H5 CHONDRITE	B	C		
ALH 97 102 ~	190.3	H5 CHONDRITE	C	B		
ALH 97 103 ~	83.3	H6 CHONDRITE	C	B/C		
ALH 97 104 ~	67.1	H6 CHONDRITE	C	C		
ALH 97 105 ~	17.8	H6 CHONDRITE	C	C		
ALH 97 106 ~	15.3	H6 CHONDRITE	C	C		
ALH 97 107 ~	44.1	H5 CHONDRITE	C	C		
ALH 97 108 ~	60.1	H6 CHONDRITE	C	C		
ALH 97 109 ~	33.4	H6 CHONDRITE	C	C		
ALH 97 110 ~	3.6	H5 CHONDRITE	C	B		
ALH 97 111 ~	8.9	H5 CHONDRITE	C	C		
LEW 97 200~	61.7	LL6 CHONDRITE	A/B	A/B		
LEW 97 201~	148.2	H5 CHONDRITE	C	C		
LEW 97 202	117.6	L3 CHONDRITE	C	B	1-33	3-10
LEW 97 203~	267.1	LL6 CHONDRITE	A/B	A/B		
LEW 97 204~	277.7	L6 CHONDRITE	B	A		
LEW 97 205~	235.0	L6 CHONDRITE	B	A		
LEW 97 206~	182.4	LL6 CHONDRITE	B/C	B		
LEW 97 207~	524.4	L6 CHONDRITE	B/C	B		
LEW 97 208~	660.7	L6 CHONDRITE	B/C	C		
LEW 97 209~	340.6	L5 CHONDRITE	B/C	B		
LEW 97 210~	288.5	L6 CHONDRITE	A/B	A		
LEW 97 211~	122.0	L6 CHONDRITE	A/B	A		
LEW 97 212~	171.9	L6 CHONDRITE	B	A		
LEW 97 213~	82.1	LL5 CHONDRITE	A/B	A		
LEW 97 214~	35.0	L6 CHONDRITE	B/C	A		
LEW 97 215~	24.3	H6 CHONDRITE	B/CE	A/B		
LEW 97 216	23.0	L3 CHONDRITE	B/C	A	9-26	3-4
LEW 97 217~	25.5	L5 CHONDRITE	B/C	A		
LEW 97 218~	28.5	H5 CHONDRITE	B/C	A		
LEW 97 219~	79.6	H5 CHONDRITE	CE	A/B		
LEW 97 220~	5.8	H5 CHONDRITE	C	B		
LEW 97 221	48.0	L3 CHONDRITE	B/C	B	5-27	4-23
LEW 97 222~	28.9	H6 CHONDRITE	C	B		
LEW 97 223~	22.7	H6 CHONDRITE	C	A/B		
LEW 97 224	4.8	H5 CHONDRITE	C	A/B	19	17
LEW 97 225	2.1	UREILITE	C	A/B	11-21	8-18
LEW 97 226~	5.7	H5 CHONDRITE	C	B		
LEW 97 227~	8.8	H5 CHONDRITE	C	B		
QUE 97 640~	14.0	LL5 CHONDRITE	B	B		
QUE 97 641~	15.1	L6 CHONDRITE	B/C	B		
QUE 97 642~	56.3	LL5 CHONDRITE	B/C	B/C		
QUE 97 643~	9.7	LL5 CHONDRITE	B/C	B/C		
QUE 97 644~	2.6	LL5 CHONDRITE	B/C	B/C		
QUE 97 645~	1.3	L6 CHONDRITE	B/C	B		
QUE 97 646~	3.7	LL5 CHONDRITE	B	B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 647~	5.5	L6 CHONDRITE	B/C	B		
QUE 97 648~	0.7	LL5 CHONDRITE	B	B		
QUE 97 649~	10.7	LL5 CHONDRITE	B/C	B/C		
QUE 97 650~	5.0	LL5 CHONDRITE	A/B	A/B		
QUE 97 651~	29.0	LL6 CHONDRITE	B	A/B		
QUE 97 652~	19.7	LL5 CHONDRITE	B	B		
QUE 97 653~	19.3	LL5 CHONDRITE	A/B	A/B		
QUE 97 654~	13.3	LL5 CHONDRITE	A/B	B		
QUE 97 655~	6.6	LL5 CHONDRITE	B	B		
QUE 97 656~	6.8	LL5 CHONDRITE	A/B	B		
QUE 97 657	3.5	CM2 CHONDRITE	B	B	0-49	0-5
QUE 97 658~	13.2	LL5 CHONDRITE	A/B	A/B		
QUE 97 659~	12.6	LL5 CHONDRITE	A/B	B		
QUE 97 660~	13.9	LL6 CHONDRITE	B	B		
QUE 97 661~	16.6	H6 CHONDRITE	B/C	B		
QUE 97 662~	18.3	LL5 CHONDRITE	B	B		
QUE 97 663~	16.4	L6 CHONDRITE	B	A/B		
QUE 97 664~	28.4	H6 CHONDRITE	C	B		
QUE 97 665~	50.1	LL5 CHONDRITE	B	B/C		
QUE 97 666~	1.9	LL5 CHONDRITE	B	B		
QUE 97 667~	1.6	LL5 CHONDRITE	B	B		
QUE 97 668~	7.2	LL5 CHONDRITE	B	B		
QUE 97 669~	41.3	LL5 CHONDRITE	B	B		
QUE 97 680~	69.9	H6 CHONDRITE	C	B		
QUE 97 681~	34.3	L4 CHONDRITE	B	B		
QUE 97 682~	19.2	L6 CHONDRITE	A/B	A/B		
QUE 97 683~	21.8	LL5 CHONDRITE	B	B		
QUE 97 684~	26.8	LL5 CHONDRITE	A	A		
QUE 97 685~	8.8	LL5 CHONDRITE	B	B		
QUE 97 686~	1.1	LL5 CHONDRITE	B/C	B		
QUE 97 687~	1.1	LL5 CHONDRITE	B	B		
QUE 97 688~	35.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 689~	5.5	L6 CHONDRITE	C	B		
QUE 97 690~	55.0	LL5 CHONDRITE	B	B		
QUE 97 691~	24.3	LL5 CHONDRITE	B	B		
QUE 97 692~	20.1	LL5 CHONDRITE	B	B		
QUE 97 693~	6.9	LL5 CHONDRITE	B	B		
QUE 97 694~	14.2	LL5 CHONDRITE	B	B		
QUE 97 695~	9.4	H6 CHONDRITE	B/C	A/B		
QUE 97 696~	14.0	L6 CHONDRITE	C	B		
QUE 97 697~	8.9	LL5 CHONDRITE	B	B		
QUE 97 698~	3.9	LL5 CHONDRITE	B	B		
QUE 97 699~	7.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 700~	11.6	LL5 CHONDRITE	A/B	A/B		
QUE 97 701~	5.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 702~	2.0	LL5 CHONDRITE	A/B	A/B		
QUE 97 703~	3.2	LL5 CHONDRITE	A/B	A/B		
QUE 97 704~	3.2	LL5 CHONDRITE	A/B	A/B		
QUE 97 705~	6.8	LL5 CHONDRITE	A/B	A/B		
QUE 97 706	6.9	LL5 CHONDRITE	B	A/B		
QUE 97 707~	1.0	LL5 CHONDRITE	B	A/B		
QUE 97 708~	2.9	LL5 CHONDRITE	B/C	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 709~	4.7	LL5 CHONDRITE	B	A/B		
QUE 97 710~	0.7	LL5 CHONDRITE	B	B		
QUE 97 711~	4.2	LL5 CHONDRITE	B	B		
QUE 97 712~	1.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 713~	6.8	LL5 CHONDRITE	B	B		
QUE 97 714~	3.3	LL5 CHONDRITE	B	B		
QUE 97 715~	4.6	LL5 CHONDRITE	B	B		
QUE 97 716~	26.7	LL5 CHONDRITE	B	B		
QUE 97 717~	3.4	LL5 CHONDRITE	CE	B		
QUE 97 718	7.4	H6 CHONDRITE	C	B	19	17
QUE 97 719~	0.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 720~	17.8	L6 CHONDRITE	C	B		
QUE 97 721~	2.4	LL5 CHONDRITE	B/C	B		
QUE 97 722~	12.9	LL5 CHONDRITE	B/C	B/C		
QUE 97 723~	23.8	LL5 CHONDRITE	B	B		
QUE 97 724~	4.0	LL5 CHONDRITE	B	A		
QUE 97 725~	7.0	LL5 CHONDRITE	B	B		
QUE 97 726~	25.2	LL5 CHONDRITE	C	B		
QUE 97 727~	4.3	LL5 CHONDRITE	B	B		
QUE 97 728~	1.1	LL5 CHONDRITE	B/C	B		
QUE 97 729~	15.5	LL6 CHONDRITE	B/C	B/C		
QUE 97 730~	55.7	LL5 CHONDRITE	A	A		
QUE 97 731~	18.1	LL5 CHONDRITE	B	A		
QUE 97 732~	1.8	LL5 CHONDRITE	A	A		
QUE 97 733~	0.9	LL5 CHONDRITE	A/B	A		
QUE 97 734~	0.3	L6 CHONDRITE	B	A		
QUE 97 735~	25.6	LL5 CHONDRITE	A	A		
QUE 97 736~	48.1	LL5 CHONDRITE	A	A		
QUE 97 737~	81.0	LL5 CHONDRITE	B	A/B		
QUE 97 738~	43.7	LL5 CHONDRITE	A	A		
QUE 97 739~	2.3	H6 CHONDRITE	C	A/B		
QUE 97 740~	2.6	LL5 CHONDRITE	B	B		
QUE 97 741~	5.8	LL5 CHONDRITE	B/C	B		
QUE 97 742~	22.4	L6 CHONDRITE	C	B		
QUE 97 743~	15.4	L6 CHONDRITE	B	A/B		
QUE 97 744~	13.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 745~	45.9	L6 CHONDRITE	C	B		
QUE 97 746~	4.6	H6 CHONDRITE	C	B		
QUE 97 747~	28.6	L6 CHONDRITE	C	B		
QUE 97 748~	1.4	L6 CHONDRITE	C	B		
QUE 97 749~	20.6	H5 CHONDRITE	C	B		
QUE 97 750~	3.8	LL5 CHONDRITE	A	A		
QUE 97 751~	26.8	LL5 CHONDRITE	A/B	A		
QUE 97 752~	77.6	LL5 CHONDRITE	A/B	A		
QUE 97 753~	150.4	LL5 CHONDRITE	B	A		
QUE 97 754~	21.1	LL5 CHONDRITE	A/B	A		
QUE 97 755~	8.3	H6 CHONDRITE	C	B		
QUE 97 756~	5.7	LL5 CHONDRITE	C	B		
QUE 97 757~	12.5	LL5 CHONDRITE	A	A		
QUE 97 758~	23.5	LL5 CHONDRITE	B	A		
QUE 97 759~	25.9	LL5 CHONDRITE	B	A		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 760~	6.2	H6 CHONDRITE	C	C		
QUE 97 761~	6.3	L6 CHONDRITE	C	B		
QUE 97 762~	69.4	L6 CHONDRITE	B/C	B		
QUE 97 763~	34.5	L6 CHONDRITE	C	B		
QUE 97 764~	31.2	LL5 CHONDRITE	A/B	A/B		
QUE 97 766~	1.8	LL5 CHONDRITE	B	A/B		
QUE 97 767~	1.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 768~	0.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 769~	7.1	L6 CHONDRITE	C	B		
QUE 97 770~	11.9	LL5 CHONDRITE	B	B		
QUE 97 771~	12.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 772~	62.9	LL5 CHONDRITE	B	C		
QUE 97 773~	21.8	LL5 CHONDRITE	A	A/B		
QUE 97 774~	3.1	LL5 CHONDRITE	A	A/B		
QUE 97 775~	5.9	LL5 CHONDRITE	B	C		
QUE 97 776~	3.8	LL5 CHONDRITE	B	B		
QUE 97 777~	4.3	LL5 CHONDRITE	B/C	B		
QUE 97 778~	7.8	LL5 CHONDRITE	B	B		
QUE 97 779~	7.5	LL5 CHONDRITE	B/C	B		
QUE 97 780~	4.8	H6 CHONDRITE	C	A/B		
QUE 97 781~	1.4	LL5 CHONDRITE	B	B		
QUE 97 782~	1.3	LL5 CHONDRITE	C	B		
QUE 97 783~	12.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 784~	0.1	L6 CHONDRITE	A/B	A/B		
QUE 97 785~	1.7	LL5 CHONDRITE	C	B		
QUE 97 786~	0.2	LL5 CHONDRITE	C	B		
QUE 97 787~	4.4	LL5 CHONDRITE	C	B		
QUE 97 788~	0.6	LL5 CHONDRITE	C	B		
QUE 97 789~	0.7	LL5 CHONDRITE	C	B		
QUE 97 790	5.3	LL5 CHONDRITE	C	C	27	23
QUE 97 791~	6.6	LL5 CHONDRITE	B	B		
QUE 97 792~	12.0	LL5 CHONDRITE	B	B		
QUE 97 793~	12.2	LL5 CHONDRITE	B/C	B		
QUE 97 794~	24.1	LL5 CHONDRITE	B	A/B		
QUE 97 795~	30.6	LL5 CHONDRITE	A/B	A/B		
QUE 97 796~	10.6	LL5 CHONDRITE	A/B	A/B		
QUE 97 797~	42.1	LL5 CHONDRITE	A/B	A/B		
QUE 97 798~	22.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 799~	9.6	LL5 CHONDRITE	A/B	A/B		
QUE 97 800	126.5	H6 CHONDRITE	C	B	19	17
QUE 97 801~	35.7	LL5 CHONDRITE	B	B/C		
QUE 97 802~	52.0	LL5 CHONDRITE	B	B/C		
QUE 97 803~	79.1	LL5 CHONDRITE	B	B		
QUE 97 804~	100.8	H6 CHONDRITE	C	B		
QUE 97 805~	74.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 806~	58.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 807~	110.9	LL5 CHONDRITE	A	A		
QUE 97 808~	38.7	LL5 CHONDRITE	B	B/.C		
QUE 97 809~	1.7	LL5 CHONDRITE	B/C	B		
QUE 97 810~	52.1	LL5 CHONDRITE	B	B		
QUE 97 811~	167.6	LL5 CHONDRITE	A/B	B		
QUE 97 812~	70.5	LL5 CHONDRITE	A/B	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 813~	11.7	LL5 CHONDRITE	A/B	A		
QUE 97 815~	4.5	LL5 CHONDRITE	B	B		
QUE 97 816~	16.2	LL5 CHONDRITE	B	B		
QUE 97 817~	10.6	LL5 CHONDRITE	B	B		
QUE 97 818~	12.2	LL5 CHONDRITE	B	B/C		
QUE 97 819~	10.1	LL5 CHONDRITE	B	B		
QUE 97 820~	0.7	LL5 CHONDRITE	A/B	A		
QUE 97 821	7.0	H6 CHONDRITE	B	A/B	19	17
QUE 97 822~	0.6	LL5 CHONDRITE	A/B	A		
QUE 97 823~	16.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 824~	3.7	LL5 CHONDRITE	B	A/B		
QUE 97 825~	3.1	LL5 CHONDRITE	A/B	A		
QUE 97 826~	1.3	LL5 CHONDRITE	A/B	A		
QUE 97 827~	4.1	LL5 CHONDRITE	A/B	A/B		
QUE 97 828	12.9	LL5 CHONDRITE	B	A/B	27	23
QUE 97 829~	19.8	LL5 CHONDRITE	A/B	A/B		
QUE 97 830~	0.4	LL5 CHONDRITE	A/B	A		
QUE 97 831~	3.8	LL5 CHONDRITE	A/B	A		
QUE 97 832~	1.4	L5 CHONDRITE	B	A		
QUE 97 833~	0.5	LL5 CHONDRITE	A/B	A		
QUE 97 834~	2.5	L5 CHONDRITE	B	A		
QUE 97 835~	1.7	LL5 CHONDRITE	A/B	A		
QUE 97 836~	7.1	LL5 CHONDRITE	A/B	A		
QUE 97 837~	0.9	LL5 CHONDRITE	A/B	A		
QUE 97 838~	0.6	LL5 CHONDRITE	A/B	A		
QUE 97 839~	37.6	LL5 CHONDRITE	A/B	A/B		
QUE 97 840~	182.4	LL5 CHONDRITE	A/B	A		
QUE 97 841~	117.0	LL5 CHONDRITE	A	A/B		
QUE 97 842~	68.0	H5 CHONDRITE	C	A/B		
QUE 97 843~	31.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 844~	65.0	LL5 CHONDRITE	A	A		
QUE 97 845~	26.7	H6 CHONDRITE	C	C		
QUE 97 846~	16.7	H6 CHONDRITE	C	C		
QUE 97 847~	14.7	LL5 CHONDRITE	B	B		
QUE 97 848~	13.8	LL5 CHONDRITE	B	B		
QUE 97 849~	115.8	H6 CHONDRITE	B/C	C		
QUE 97 850~	82.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 851~	46.9	L5 CHONDRITE	B/C	B		
QUE 97 852~	121.1	LL5 CHONDRITE	A/B	A/B		
QUE 97 853~	38.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 854~	8.7	H6 CHONDRITE	C	B		
QUE 97 855~	44.3	LL5 CHONDRITE	A/B	A/B		
QUE 97 856~	15.3	LL5 CHONDRITE	A/B	A/B		
QUE 97 857~	8.5	LL6 CHONDRITE	A/B	A/B		
QUE 97 858~	13.6	LL5 CHONDRITE	B	A/B		
QUE 97 859~	1.8	LL5 CHONDRITE	A/B	A/B		
QUE 97 860~	27.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 861~	3.4	LL5 CHONDRITE	A/B	A/B		
QUE 97 862~	19.6	L6 CHONDRITE	B/C	A/B		
QUE 97 863~	20.5	LL5 CHONDRITE	B	A/B		
QUE 97 864~	1.0	LL5 CHONDRITE	A/B	A/B		
QUE 97 865~	4.1	H6 CHONDRITE	C	C		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 866~	3.4	LL5 CHONDRITE	B/C	B		
QUE 97 867~	18.4	LL6 CHONDRITE	A/B	A/B		
QUE 97 868~	4.7	LL5 CHONDRITE	B	B		
QUE 97 869~	2.8	LL5 CHONDRITE	B	B		
QUE 97 870~	98.1	H6 CHONDRITE	C	A/B		
QUE 97 871~	40.0	LL5 CHONDRITE	A/B	B/C		
QUE 97 872~	99.9	LL5 CHONDRITE	C	C		
QUE 97 873~	22.8	LL5 CHONDRITE	C	B		
QUE 97 874~	47.5	LL5 CHONDRITE	A	A/B		
QUE 97 875~	26.6	LL5 CHONDRITE	C	C		
QUE 97 876~	21.5	H6 CHONDRITE	C	C		
QUE 97 877~	13.0	LL5 CHONDRITE	C	B/C		
QUE 97 878~	31.9	LL5 CHONDRITE	A/B	A/B		
QUE 97 879~	27.2	H5 CHONDRITE	C	B		
QUE 97 880~	5.7	LL5 CHONDRITE	B/C	B		
QUE 97 881~	5.8	LL5 CHONDRITE	A/B	B		
QUE 97 882~	4.5	H6 CHONDRITE	C	B		
QUE 97 883~	0.4	L5 CHONDRITE	A/B	A/B		
QUE 97 884~	0.7	LL5 CHONDRITE	A/B	A/B		
QUE 97 885~	2.6	LL5 CHONDRITE	B	B		
QUE 97 886~	3.9	LL6 CHONDRITE	A/B	A/B		
QUE 97 887~	2.5	LL5 CHONDRITE	A/B	A/B		
QUE 97 888~	14.3	LL5 CHONDRITE	A/B	A/B		
QUE 97 889~	14.5	L5 CHONDRITE	B/C	B		
QUE 97 890~	3.2	LL5 CHONDRITE	B/C	A/B		
QUE 97 891~	2.9	LL5 CHONDRITE	B/C	B		
QUE 97 892~	1.8	L6 CHONDRITE	B	A/B		
QUE 97 893~	3.9	LL5 CHONDRITE	B	A/B		
QUE 97 894~	18.3	LL5 CHONDRITE	B	B		
QUE 97 895~	0.8	LL5 CHONDRITE	A/B	A/B		
QUE 97 896~	2.1	LL5 CHONDRITE	B	B		
QUE 97 897~	3.3	LL5 CHONDRITE	B	B		
QUE 97 898~	2.2	LL5 CHONDRITE	B	A/B		
QUE 97 899~	9.2	LL5 CHONDRITE	B	B		
QUE 97 900~	15.3	LL5 CHONDRITE	A/B	B		
QUE 97 901~	10.4	H6 CHONDRITE	C	B		
QUE 97 902~	31.3	LL5 CHONDRITE	C	C		
QUE 97 903~	31.4	LL5 CHONDRITE	C	B		
QUE 97 904~	37.4	H6 CHONDRITE	C	C		
QUE 97 905~	15.7	L5 CHONDRITE	C	B		
QUE 97 906~	12.0	LL5 CHONDRITE	B	B		
QUE 97 907~	5.1	LL5 CHONDRITE	B	B		
QUE 97 908~	1.6	LL5 CHONDRITE	B	B		
QUE 97 909~	4.8	LL5 CHONDRITE	B	B		
QUE 97 910~	29.4	LL5 CHONDRITE	B	B		
QUE 97 911~	28.7	L6 CHONDRITE	B/C	B		
QUE 97 912~	49.3	LL5 CHONDRITE	B	A/B		
QUE 97 913~	21.0	LL5 CHONDRITE	A/B	B		
QUE 97 914~	15.1	LL5 CHONDRITE	A/B	B		
QUE 97 915~	11.5	L6 CHONDRITE	B	A/B		
QUE 97 916~	18.0	LL5 CHONDRITE	B	B		
QUE 97 917~	128.1	L5 CHONDRITE	B/C	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 918~	22.9	LL5 CHONDRITE	B	B		
QUE 97 919~	36.1	LL5 CHONDRITE	B	B		
QUE 97 920~	15.9	LL5 CHONDRITE	B/C	B		
QUE 97 921~	6.0	LL5 CHONDRITE	A	A		
QUE 97 922~	2.3	LL5 CHONDRITE	B	B		
QUE 97 923~	13.7	LL5 CHONDRITE	A/B	B		
QUE 97 924~	2.4	H6 CHONDRITE	C	B		
QUE 97 925~	5.7	LL5 CHONDRITE	B/C	B		
QUE 97 926~	6.9	LL5 CHONDRITE	A	A		
QUE 97 927~	8.3	LL5 CHONDRITE	A/B	A/B		
QUE 97 928~	1.4	LL5 CHONDRITE	B/C	B		
QUE 97 929~	14.8	LL5 CHONDRITE	B/C	B/C		
QUE 97 930~	3.8	LL5 CHONDRITE	B	B/C		
QUE 97 931~	0.8	LL5 CHONDRITE	B	B		
QUE 97 932~	9.6	LL5 CHONDRITE	B	B		
QUE 97 933~	6.7	LL5 CHONDRITE	B	B		
QUE 97 934~	1.8	L5 CHONDRITE	B/C	B		
QUE 97 935~	3.6	LL5 CHONDRITE	B/C	B		
QUE 97 936~	2.1	LL5 CHONDRITE	B	B		
QUE 97 937~	11.0	LL5 CHONDRITE	B	B		
QUE 97 938~	18.9	LL5 CHONDRITE	A	A		
QUE 97 939~	5.3	LL5 CHONDRITE	B/C	B		
QUE 97 940~	58.4	L5 CHONDRITE	B/C	A/B		
QUE 97 941~	43.6	LL5 CHONDRITE	B/C	B/C		
QUE 97 942~	52.9	LL6 CHONDRITE	A/B	B		
QUE 97 943~	21.0	LL5 CHONDRITE	B	B		
QUE 97 944~	14.5	LL5 CHONDRITE	B	B		
QUE 97 945~	51.1	LL5 CHONDRITE	B	B		
QUE 97 946~	6.5	LL5 CHONDRITE	B/C	B		
QUE 97 947~	51.6	L5 CHONDRITE	B	B		
QUE 97 948~	3.4	H5 CHONDRITE	B/C	B		
QUE 97 949~	5.0	LL5 CHONDRITE	B/C	B/C		
QUE 97 950~	7.8	LL6 CHONDRITE	B/C	B		
QUE 97 951~	2.7	LL5 CHONDRITE	C	B		
QUE 97 952~	42.0	LL5 CHONDRITE	C	A/B		
QUE 97 953~	1.7	LL5 CHONDRITE	B	B		
QUE 97 954~	12.9	LL5 CHONDRITE	A/B	B		
QUE 97 955~	8.8	LL5 CHONDRITE	B/C	B		
QUE 97 956~	8.5	H5 CHONDRITE	C	B		
QUE 97 957~	3.5	H5 CHONDRITE	C	B		
QUE 97 958	1.8	CM2 CHONDRITE	A	A	0-48	-
QUE 97 959~	34.8	LL5 CHONDRITE	A/B	C		
QUE 97 960~	17.6	LL5 CHONDRITE	B/C	B/C		
QUE 97 961~	72.7	LL5 CHONDRITE	B	B/C		
QUE 97 962~	10.0	LL5 CHONDRITE	B	B		
QUE 97 963~	21.9	L5 CHONDRITE	C	B		
QUE 97 964~	5.2	LL5 CHONDRITE	B	B		
QUE 97 965~	2.4	H5 CHONDRITE	C	A/B		
QUE 97 966~	4.7	L5 CHONDRITE	C	B		
QUE 97 967~	0.8	LL5 CHONDRITE	B	B		
QUE 97 968~	1.8	LL5 CHONDRITE	B	B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 97 969~	4.1	LL5 CHONDRITE	B	B		
QUE 97 970~	15.2	H6 CHONDRITE	C	B		
QUE 97 971~	81.3	LL5 CHONDRITE	B	B		
QUE 97 972~	8.2	LL5 CHONDRITE	B	B		
QUE 97 973~	39.3	L5 CHONDRITE	B/C	B		
QUE 97 974~	35.4	LL5 CHONDRITE	B	B		
QUE 97 975~	49.1	LL5 CHONDRITE	A/B	B		
QUE 97 976~	68.6	LL5 CHONDRITE	A/B	B		
QUE 97 977~	43.4	L6 CHONDRITE	C	B		
QUE 97 978~	8.4	LL5 CHONDRITE	B	B		
QUE 97 979~	20.5	LL5 CHONDRITE	B/C	B		
QUE 97 980~	89.7	H6 CHONDRITE	C	B		
QUE 97 981~	6.0	LL5 CHONDRITE	B	B		
QUE 97 982~	8.9	LL5 CHONDRITE	B	B		
QUE 97 983~	48.8	LL5 CHONDRITE	B	B		
QUE 97 984~	20.3	H6 CHONDRITE	C	B		
QUE 97 985~	16.2	LL5 CHONDRITE	B	B		
QUE 97 986~	31.3	LL5 CHONDRITE	B	B		
QUE 97 987~	34.7	LL5 CHONDRITE	B	B		
QUE 97 988~	9.6	LL6 CHONDRITE	B	B		
QUE 97 989~	1.8	L5 CHONDRITE	B	B		
QUE 97 990	67.3	CM2 CHONDRITE	BE	B	0-61	0-1
QUE 97 991	6.8	DIOGENITE	B	B	-	25
QUE 97 992~	21.2	LL5 CHONDRITE	B	B		
QUE 97 993~	14.2	LL5 CHONDRITE	C	B		
QUE 97 994~	9.1	LL6 CHONDRITE	B	B		
QUE 97 995~	23.1	LL5 CHONDRITE	A/B	B		
QUE 97 996~	9.6	LL5 CHONDRITE	A/B	B		
QUE 97 997~	3.1	LL5 CHONDRITE	B	B		
QUE 97 998	3.0	LL5 CHONDRITE	B	A/B	28	23
QUE 97 999	1.0	LL5 CHONDRITE	B	A/B	28	23
QUE 971000~	0.4	LL5 CHONDRITE	C	B		
QUE 971001~	22.2	LL5 CHONDRITE	B	B		
QUE 971002~	4.5	H6 CHONDRITE	B/C	B		
QUE 971003~	52.4	LL5 CHONDRITE	B	B		
QUE 971004~	7.6	LL5 CHONDRITE	B	B		
QUE 971005~	15.5	H6 CHONDRITE	C	B		
QUE 971006~	21.0	H6 CHONDRITE	C	B		
QUE 971007~	7.1	LL5 CHONDRITE	B	C		
QUE 971008~	1.7	LL5 CHONDRITE	B	B		
QUE 971009~	0.2	LL5 CHONDRITE	B	B		
QUE 971010~	2.4	H5 CHONDRITE	C	B		
QUE 971011~	34.4	LL5 CHONDRITE	A/B	B		
QUE 971012~	22.6	H6 CHONDRITE	C	B		
QUE 971013~	6.6	LL5 CHONDRITE	B	B		
QUE 971014~	0.5	LL5 CHONDRITE	B	B		
QUE 971015~	1.0	LL5 CHONDRITE	B	B		
QUE 971016~	0.1	LL5 CHONDRITE	B	B		
QUE 971018~	0.4	LL5 CHONDRITE	B	B		
QUE 971019~	4.6	LL5 CHONDRITE	B	B		
QUE 971020~	21.3	LL5 CHONDRITE	A/B	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 971021~	56.8	LL5 CHONDRITE	B	B		
QUE 971022~	37.4	LL5 CHONDRITE	C	C		
QUE 971023	11.4	H3 CHONDRITE	C	C	6-19	5-31
QUE 971024~	3.3	LL5 CHONDRITE	A/B	A/B		
QUE 971025~	26.6	LL5 CHONDRITE	B	A/B		
QUE 971026~	64.0	H6 CHONDRITE	C	A/B		
QUE 971027~	69.6	L6 CHONDRITE	B/C	B		
QUE 971028~	58.1	LL5 CHONDRITE	B	B/C		
QUE 971029~	41.5	LL5 CHONDRITE	B	B		
QUE 971030~	4.3	LL5 CHONDRITE	B	B		
QUE 971031~	4.6	LL5 CHONDRITE	B	B		
QUE 971032~	2.1	LL5 CHONDRITE	B	B		
QUE 971033~	8.0	LL5 CHONDRITE	B	B		
QUE 971034~	3.3	LL5 CHONDRITE	B	B		
QUE 971035~	8.7	LL5 CHONDRITE	B	B		
QUE 971036~	37.1	LL5 CHONDRITE	B	B		
QUE 971037~	27.3	LL5 CHONDRITE	B	B		
QUE 971038~	6.8	H6 CHONDRITE	C	C		
QUE 971039~	8.9	LL5 CHONDRITE	B/C	B		
QUE 971040~	0.4	LL5 CHONDRITE	B	B		
QUE 971041~	4.7	H6 CHONDRITE	C	A/B		
QUE 971042~	2.5	H6 CHONDRITE	C	A/B		
QUE 971043~	76.0	LL5 CHONDRITE	B	B		
QUE 971044~	68.9	LL5 CHONDRITE	B	B		
QUE 971045~	479.6	LL5 CHONDRITE	A/B	A		
QUE 971046~	17.4	LL6 CHONDRITE	C	B/C		
QUE 971047~	99.1	H6 CHONDRITE	C	B		
QUE 971048~	313.6	LL5 CHONDRITE	A/B	A		
QUE 971049~	3.7	L6 CHONDRITE	B	B		
QUE 971050~	16.9	H6 CHONDRITE	C	B		
QUE 971051~	98.9	H6 CHONDRITE	C	B		
GDR 98 400	77.8	L6 CHONDRITE	B/C	A/B	25	21
GDR 98 401	5.3	H4 CHONDRITE	C	A/B	19	17
KLE 98 300	33.6	EH3 CHONDRITE	A	A	0-1	0-2
SCO 98 200	311.5	L4 CHONDRITE	A/B	B	25	21
SCO 98 201	199.0	L6 CHONDRITE	B/C	A/B	25	21
SCO 98 202	84.3	L6 CHONDRITE	B	A/B	25	21
EET 99 400	233.8	HOWARDITE	B	B	-	17-22
EET 99 401	604.6	H5 CHONDRITE	B/C	C	18	16
EET 99 402	180.5	BRACHINITE	B	B	35	
EET 99 403	111.8	L6 CHONDRITE	B	B	25	21
EET 99 404	339.6	H4 CHONDRITE	B	B/C	18	16
EET 99 405	104.3	L5 CHONDRITE	A/B	B	25	21
EET 99 406	112.9	H5 CHONDRITE	B	C	18	16
EET 99 407	60.0	BRACHINITE	B	B	35	
EET 99 408	147.7	HOWARDITE	A/B	A/B	-	21-27

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 99 001	22000.	IRON				
QUE 99 002	2749.6	H6 CHONDRITE	C	C	19	17
QUE 99 003	3492.1	H5 CHONDRITE	B	A/B	19	17
QUE 99 004	2369.4	H5 CHONDRITE	B/C	A/B	19	17
QUE 99 005	64.0	EUCRITE (BRECCIATED)	B	B	-	63
QUE 99 006	133.1	EUCRITE (BRECCIATED)	B	B	-	61

~Classified by using refractive indices.

****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.

Table 2: Newly Classified Specimens Listed By Type **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
Achondrites						
EET 99 402	180.5	BRACHINITE	B	B	35	-
EET 99 407	60.0	BRACHINITE	B	B	35	-
QUE 97 991	6.8	DIOGENITE	B	B	-	25
QUE 99 005	64.0	EUCRITE (BRECCIATED)	B	B	-	63
QUE 99 006	133.1	EUCRITE (BRECCIATED)	B	B	-	61
EET 99 400	233.8	HOWARDITE	B	B	-	17-22
EET 99 408	147.7	HOWARDITE	A/B	A/B	-	21-27
LEW 97 225	2.1	UREILITE	C	A/B	11-21	8-18
Carbonaceous Chondrites						
QUE 97 657	3.5	CM2 CHONDRITE	B	B	0-49	0-5
QUE 97 958	1.8	CM2 CHONDRITE	A	A	0-48	-
QUE 97 990	67.3	CM2 CHONDRITE	BE	B	0-61	0-1
Chondrites - Type 3						
QUE 971023	11.4	H3 CHONDRITE	C	C	6-19	5-31
LEW 97 202	117.6	L3 CHONDRITE	C	B	1-33	3-10
LEW 97 216	23.0	L3 CHONDRITE	B/C	A	9-26	3-4
LEW 97 221	48.0	L3 CHONDRITE	B/C	B	5-27	4-23
E Chondrites						
KLE 98 300	33.6	EH3 CHONDRITE	A	A	0-1	0-2
Irons						
QUE 99 001	22000.	IRON				

Table 3: Tentative Pairings for New Specimens

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 Bulletin No. 76 (Meteoritics 29, 100-143) and Meteoritical Bulletin No. 79 (Meteoritics and Planetary Science 31, A161-174).

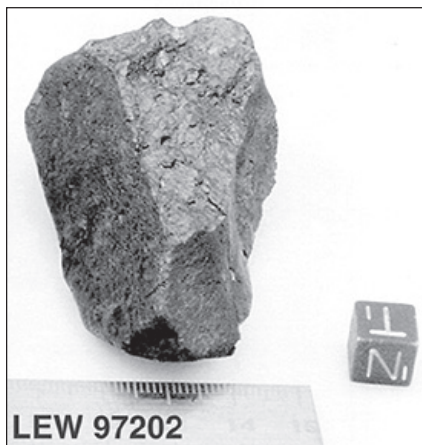
BRACHINITES

EET 99407 with EET 99402

HOWARDITES

EET 99408 with EET 99400

Petrographic Descriptions



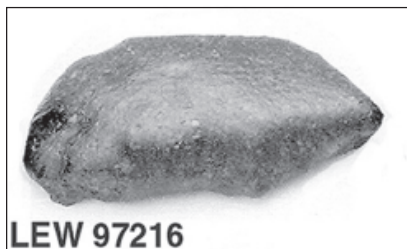
Sample No.: LEW 97202
Location: Lewis Cliff
Dimensions (cm): 7.0x3.0x2.5
Weight (g): 117.596
Meteorite Type: L3 Chondrite
 (estimated 3.4)

Macroscopic Description:
Kathleen McBride

75% of the exterior of this meteorite has brown/black fusion crust with polygonal fractures and oxidation. The interior is rusty with a few light colored, mm sized chondrules. The meteorite is hard and contains numerous metal grains.

Thin Section (, 2) Description:
Tim McCoy

The section exhibits numerous well-defined chondrules (up to 2 mm) in a black matrix of fine-grained silicates, metal and troilite. Polysynthetically twinned pyroxene is extremely abundant. Silicates are unequibrated; olivines range from Fa_{1-33} and pyroxenes from Fs_{3-10} . The meteorite is an L3 chondrite (estimated subtype 3.4).



Sample No.: LEW 97216
Location: Lewis Cliff
Dimensions (cm): 4.7x2.5x1.0
Weight (g): 22.995
Meteorite Type: L3 Chondrite
 (estimated 3.7)

Macroscopic Description:
Cecilia Satterwhite

The exterior of this meteorite has black fusion crust over 75% of its surface with oxidation haloes visible. The interior is dark gray to black with oxidation scattered and metal present.

Thin Section (, 2) Description:
Tim McCoy

The section exhibits numerous well-defined chondrules (up to 2 mm) in a black matrix of fine-grained silicates, metal and troilite. Shock effects, including some flattening of chondrules, are evident. Polysynthetically twinned pyroxene is extremely abundant. The meteorite is weathered. Silicates are unequibrated; olivines range from Fa_{9-26} , with most grains Fa_{24-26} , and pyroxenes from Fs_{3-4} . The meteorite is an L3 chondrite (estimated subtype 3.7).



Sample No.: LEW 97221
Location: Lewis Cliff
Dimensions (cm): 4.5x4.0x2.5
Weight (g): 47.963
Meteorite Type: L3 Chondrite

Macroscopic Description:
Kathleen McBride

50% of the exterior of this ordinary chondrite has brown/black fusion crust with oxidation halos. The interior has a rusty matrix with light gray inclusions 1-3 mm in diameter. The meteorite is hard and coherent.

Thin Section (, 2) Description:
Tim McCoy

The section exhibits a 7 by 10 mm clast of a highly metamorphosed ordinary chondrite in a matrix of much lower petrologic type. Mineral compositions range from Fa_{5-27} , with most grains Fa_{25-26} , and pyroxenes from Fs_{4-23} . The meteorite is an L chondrite breccia with a type 6 clast in a matrix of type 3 material.



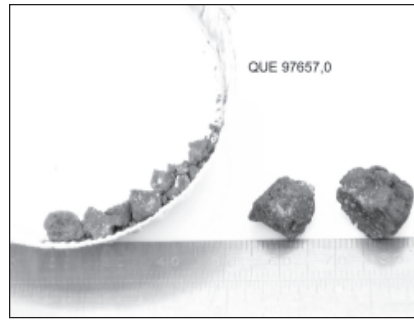
Sample No.: LEW 97225
Location: Lewis Cliff
Dimensions (cm): 1.0x0.75x1.25
Weight (g): 2.106
Meteorite Type: Ureilite

Macroscopic Description:
Kathleen McBride

Smooth brown/black fusion crust completely covers the exterior surface. The interior has a yellowish matrix with heavy oxidation and rust areas.

Thin Section (, 2) Description:
Tim McCoy

The section consists of an aggregate of large olivine and pyroxene grains up to 2 mm across. Individual olivine grains are rimmed by carbon-rich material containing traces of metal. Modest shock effects (e.g., planar fractures) are present. Olivine has cores of Fa_{21} , with rims reduced to Fa_{11} . Most pigeonite is $Fs_{18}Wo_9$ with a single rim value of Fs_8Wo_9 . The meteorite is a ureilite.



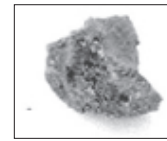
Sample No.: QUE 97657
Location: Queen Alexandra Range
Dimensions (cm): 2.0x1.5x1.5
Weight (g): 3.524
Meteorite Type: CM2 Chondrite

Macroscopic Description:
Kathleen McBride

This carbonaceous chondrite has a small purplish patch of fusion crust on the exterior surface. The interior has white to gray chondrules ≤ 1 mm in size. The matrix is black, soft and powdery.

Thin Section (, 3) Description:
Tim McCoy, Linda Welzenbach

This section consists of small chondrules (up to 0.8 mm), aggregates and mineral grains in a black matrix. Olivine compositions range from $Fa_{0.49}$, with most $Fa_{0.1}$. Low-Ca pyroxene is $Fs_{1.5}$. The matrix is composed dominantly of Fe-rich serpentine. The meteorite is a CM2 chondrite.



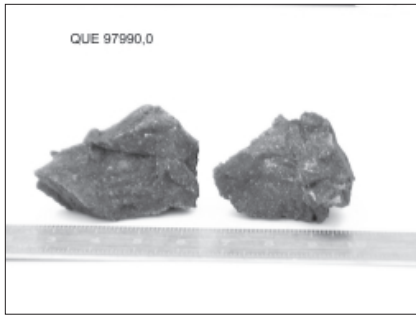
Sample No.: QUE 97958
Location: Queen Alexandra Range
Dimensions (cm): 1.5x1.5x1.0
Weight (g): 1.754
Meteorite Type: CM2 Chondrite

Macroscopic Description:
Kathleen McBride

30% of the exterior of this carbonaceous chondrite has black vesicular fusion crust. The interior has a black matrix with gray crystalline inclusions up to 1 mm in size.

Thin Section (, 2) Description:
Tim McCoy

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 $Fa_{0.48}$, with many $Fa_{0.2}$. The matrix consists dominantly of an Fe-rich serpentine. The meteorite is a CM2 chondrite.



Sample No.: QUE 97990
Location: Queen Alexandra Range
Dimensions (cm): 5.5x3.5x3.0
Weight (g): 67.297
Meteorite Type: CM2 Chondrite

Macroscopic Description:

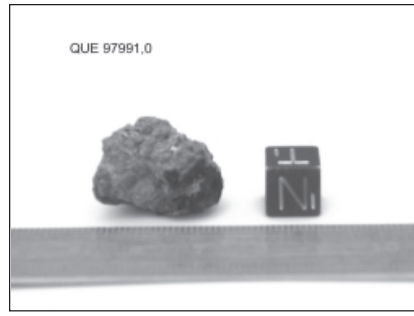
Kathleen McBride

Exterior of this carbonaceous chondrite has rough purplish black fusion crust on 50% of the surface. Polygonal fractures and evaporites are also visible. The interior matrix is black and contains white and rust colored chondrules up to 1 mm in size.

Thin Section (, 4) Description:

Tim McCoy

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. A slight lineation, with some chondrule flattening, is present. Olivine compositions are Fa_{0-61} , with many Fa_{0-2} , orthopyroxene is Fs_{0-1} . The matrix consists dominantly of an Fe-rich serpentine. The meteorite is a CM2 chondrite.



Sample No.: QUE 97991
Location: Queen Alexandra Range
Dimensions (cm): 2.0x1.25x1.5
Weight (g): 6.766
Meteorite Type: Diogenite

Macroscopic Description:

Kathleen McBride

The exterior of this achondrite has dull black fusion crust on 45% of its surface. The interior is a tan matrix with melted appearing clasts and some minor cracks. The meteorite is friable and coarse grained with rust scattered. Irregularly shaped inclusions are white and black.

Thin Section (, 3) Description:

Tim McCoy

The section shows a groundmass of coarse (up to 1.5 mm) comminuted pyroxene, with minor plagioclase and SiO_2 . Orthopyroxene has a composition of $Fs_{25}Wo_{1-4}$ and plagioclase is $An_{78-85}Or_{0-3}$. The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a diogenite.



Sample No.: QUE 971023
Location: Queen Alexandra Range
Dimensions (cm): 3.0x1.5x1.5
Weight (g): 11.437
Meteorite Type: H3 Chondrite (estimated 3.5)

Macroscopic Description:

Kathleen McBride

This ordinary chondrite has smooth brown/black fusion crust over 90% of its exterior. Oxidation halos are visible. The interior is moldy, black and rust colored matrix.

Thin Section (, 2) Description:

Tim McCoy

The section exhibits numerous small, well-defined chondrules (up to 1 mm) in a black matrix of fine-grained silicates, metal and troilite. Polysynthetically twinned pyroxene is extremely abundant. The meteorite is moderately weathered. Silicates are unequilibrium; olivines range from Fa_{6-19} and pyroxenes from Fs_{5-31} . The meteorite is an H3 chondrite (estimated subtype 3.5).



Sample No.: KLE 98300
Location: Klein Glacier
Dimensions (cm): 3.5x2.5x2.0
Weight (g): 33.598
Meteorite Type: EH3 Chondrite

Macroscopic Description:

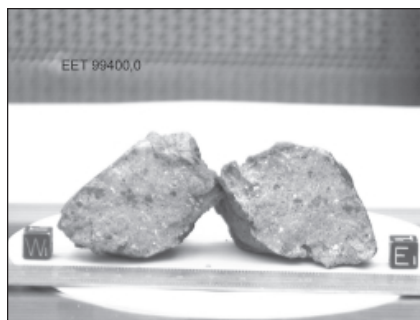
Kathleen McBride

The exterior of this meteorite has brown black fusion crust over 70% of its surface area. It has a rough texture and minor evaporates. The exposed interior has a rusty black color. The interior is a dark gray, almost metallic appearing, hard, dense material. Evaporites are present. A sulfurous odor emanates from the freshly broken faces. Circular shaped “vugs” less than 1 mm in size are visible.

Thin Section (, 4) Description:

Tim McCoy, Linda Welzenbach

The section shows an aggregate of chondrules (up to 1 mm), chondrule fragments, and pyroxene grains in a matrix of about 30% metal and sulfide. Chondrules contain moderate to small abundances of olivine. Weathering is modest, with staining of some enstatite grains and minor alteration of metal and sulfides. 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.: EET 99400;
99408
Location: Elephant Moraine
Dimensions (cm): 7.5x4.5x3.5;
 8.0x4.5x2.0
Weight (g): 233.8; 147.736
Meteorite Type: Howardite

Macroscopic Description:

Kathleen McBride

Both of these achondrites have black shiny fusion crust with polygonal fractures covering 20% of the exterior. The interior is concrete gray with angular to sub angular black, white, tan and gray clasts. Olivine crystals are visible. There is no visible metal, but thin minor fractures are present.

Thin Section (, 5) Description:

Tim McCoy

These meteorites are so similar that a single description suffices. The sections show a groundmass of comminuted pyroxene and plagioclase (up to 0.5 mm) with fine- to coarse-grained basaltic and pyroxenitic clasts ranging up to 1 mm. Pyroxene consists of orthopyroxene ($Fs_{17-27}Wo_{0-1}$), pigeonite ($Fs_{42-50}Wo_{13-15}$) and augite ($Fs_{24}Wo_{37}$). The Fe/Mn ratio of pyroxene is ~30. Plagioclase is $Or_{80-94}Wo_{0-1}$. The meteorites are howardites.



Sample No.: EET 99402;
99407
Location: Elephant Moraine
Dimensions (cm): 6.0x4.5x4.0;
 4.5x3.0x2.0
Weight (g): 180.478; 60.043
Meteorite Type: Brachinites

Macroscopic Description:

Kathleen McBride

Both of these meteorites' exterior surfaces are rough, black and granular in appearance. EET99407 has some gray-black fusion crust. The interiors have a granular crystalline texture that is somewhat friable. The matrix is gray to black in color with dark gray crystalline mineral grains cemented by fine rusty material. Some areas appear like they've been melted together.

Thin Section (, 6; 4) Description:

Tim McCoy

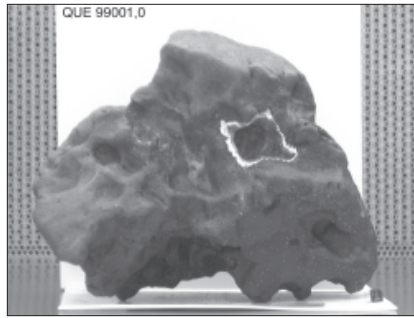
These meteorites are so similar that a single description suffices. The sections are composed dominantly of equant olivine (Fa_{35} ; 0.2-1.5 mm in diameter) with 120° triple junctions. Calcic pyroxene (Fs_{10-12} ; Wo_{43-46}) and plagioclase (An_{38-40} ; $Or_{0.1-0.3}$) comprise a few percent of the meteorite each and are heterogeneously distributed. Minor chromite and iron sulfides are also present. The rocks are moderately

shocked, with planar fractures in olivine and mosaicism in feldspar. The meteorites are probably brachinites.

Oxygen Isotope analysis:

T.K.Mayeda and R.N.Clayton

Our analysis for EET 99402 gives: delta-18=+3.57, delta-17=+1.65. This is indistinguishable from Brachina, for which the values are: +3.48, +1.61 (Clayton and Mayeda, 1996).



Sample No.: QUE 99001
Location: Queen Alexandra Range
Dimensions: 22 x 24 x 14.5 cm
Weight (g): 22,000
Meteorite Type: Iron, IAB (?)

Macroscopic Description:

Tim McCoy, Linda Welzenbach and Kathleen McBride

The mass is an irregular triangle in outline, and wedge-like in cross-section, 22 x 24 cm, and 14.5 at its widest tapering to 9.5 cm. Found partially within the ice at the time of recovery, the surface is marked by a definite line of color and texture change corresponding to the area below the ice. Almost half the meteorite, a short leg of the triangle, was below the ice. This area is light reddish-brown to orange, red and greenish oxidation colors. Luster is matte, and the surface expression is undulatory and mildly micropitted. In contrast, the above ice half is dark metallic reddish-brown, heavily sculpted and micropitted. Millimeter-sized whitish specks are evenly distributed over the same. Prominent features include a 4cm vug with minor flaking, surrounded by a whitish evaporative ring, and a 3 cm deep, 2 cm wide and 7 cm long gash-like vug, both in the below ice portion. A complete hole goes through one corner of the above ice section.

Microscopic Description:

Tim McCoy and Linda Welzenbach

The main mass (,0) was cut twice. The first cut remove a 7.5 cm thick end piece cutting across the ice line and intersecting the long gash-like vug.

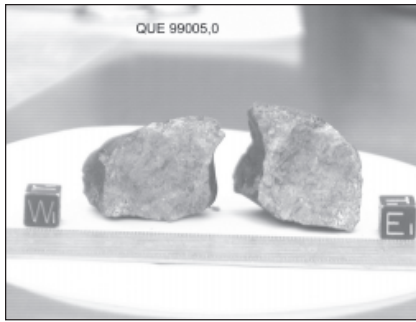
The second cut removed a parallel 2.7 cm thick slice with a surface area of 11 x 20 cm. The cut face of the end piece and one face of the slice were polished, etched and examined in a binocular microscope for this description.

The overall structure is between a coarse (Og) and coarsest (Ogg) octahedrite with short (L/W~5) kamacite bands with bandwidths of 3-5 mm. There are coarser kamacite regions often 2-3 cm in diameter, but reaching up to 5 cm. Subgrain boundaries are common in the kamacite, as are Neumann bands. Terrestrial weathering has penetrated along many of the grain boundaries and produced cracks, even in the interior of the meteorite.

The meteorite has a prominent heat altered zone extending 1-5 mm into the interior and in some places, particularly on one side of the slice, preserves the original fusion crust.

The 7 cm long gash-like vug opens up through a small crevice into a 1.5 cm diameter tube extending back another 8-10 cm. This 1.5 cm diameter tube was filled with sulfide, which remains at the opposite end of the tube and is exposed on the opposite face of the meteorite. The large slice has an exposed troilite nodule, partially ablated during atmospheric passage, measuring 2 by 2.5 cm. The troilite is polycrystalline, with domains approaching 7 mm. Graphite is rare or absent and the troilite appears only incompletely rimmed by schreibersite. No silicates were observed.

The appearance is similar in many respects to some of the coarsest IAB irons, particularly Osseo (Buchwald, 1975). However, the troilite inclusion does not appear to contain graphite or the typical inclusion rimming sequence (graphite, cohenite, schreibersite, swathing kamacite) seen in many IAB irons. The possibility exists that this meteorite, like many Antarctic irons, is ungrouped.



Sample No.: QUE 99005
Location: Queen Alexandra Range
Dimensions (cm): 5.0x2.5x3.5
Weight (g): 64.0
Meteorite Type: Eucrite (Brecciated)

Macroscopic Description:

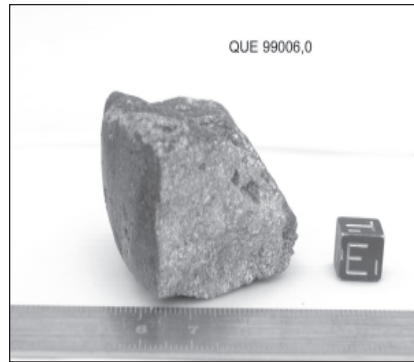
Kathleen McBride

A rough black fusion crust covers 75% of the exterior of this achondrite. The fusion crust exhibits polygonal fractures and a few shiny patches. It has a rough texture and the exposed interior is gray. The interior is fine-grained gray matrix. Near the edges are coarse black and white grains. Some black and white clasts are visible within the gray matrix.

Thin Section (, 4) Description:

Tim McCoy

This section is dominated by fine-grained, quench-textured clasts with pyroxene microphenocrysts set in a cryptocrystalline to devitrified glassy matrix. This material is nearly identical to the unusual eucrite ALHA81001 (Warren and Jerde, 1987, *GCA* **51**, 713-725). Coarser-grained clasts are observed bordering and intermixed with this finer-grained material. Mineral compositions are relatively homogeneous with orthopyroxene (Fs₆₃Wo₂), with fine lamellae of augite (Fs₂₈Wo₄₂), and plagioclase (An₈₆₋₉₃Or₀₋₁). The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a brecciated eucrite.



Sample No.: QUE 99006
Location: Queen Alexandra Range
Dimensions (cm): 7.0x4.0x3.5
Weight (g): 133.079
Meteorite Type: Eucrite (Brecciated)

Macroscopic Description:

Kathleen McBride

Thin dark gray fusion crust covers 50% of this meteorite's exterior surface. Numerous vugs or plucked areas including a large one ~3 cm wide is on one surface. The interior matrix is gray and white crystalline matrix with some rusty stains. It is coarse grained, and has a soft friable texture.

Thin Section (, 5) Description:

Tim McCoy

The section consists of a granoblastic matrix of pyroxene and plagioclase with coarser basaltic clasts up to 2.5 mm. Mineral compositions are relatively homogeneous with orthopyroxene (Fs₆₁Wo₂), with fine lamellae of augite (Fs₂₆Wo₄₄), and plagioclase (An₈₆₋₉₁Or₀₋₁). The Fe/Mn ratio of the pyroxene is ~30. The meteorite is a brecciated eucrite.

Table 4: Natural Thermoluminescence (NTL) Data for Antarctic Meteorites

Paul H. Benoit and Derek W.G. Sears
 Cosmochemistry Group
 University of Arkansas
 Fayetteville, AR 72701 USA

The measurement and data reduction methods were described by Hasan *et al.* (1987, *Proc. 17th LPSC*, E703-E709; 1989, *LPSC XX*, 383-384). For meteorites whose TL lies between 5 and 100 krad, the natural TL is related primarily to terrestrial history. Samples with NTL <5 krad have TL levels below that which can reasonably be ascribed to long terrestrial ages. Such meteorites have had their TL lowered by heating within the last million years or so by close solar passage, shock heating, or atmospheric entry, exacerbated in the case of some achondrites by anomalous fading. We suggest meteorites with NTL >100 krad are candidates for unusual orbital/thermal histories (Benoit and Sears, 1993, *EPSL*, 120, 463-471)

Sample	Class	Natural TL [krad at 250°C]	Sample	Class	Natural TL [krad at 250°C]
GRA 98006	EUC	7.1 ± 0.4	GRA 98017	H5	139.8 ± 0.3
GRA 98019	EUC	5.6 ± 0.5	GRA 98040	H5	14 ± 2
GRA 98037	EUC	6 ± 2	GRA 98047	H5	63.2 ± 0.2
GRA 98042	EUC	5.6 ± 0.5	GRA 98051	H5	47.6 ± 0.3
GRA 98043	EUC	3.0 ± 0.7			
GRA 98054	EUC	4.8 ± 0.6	GRA 98034	H6	32.0 ± 0.6
GRA 98055	EUC	6.9 ± 0.6	GRA 98048	H6	34.3 ± 0.5
GRA 98032	URE	n.d.*	GRA 98003	L5	23.8 ± 0.1
GRA 98023	H3	62 ± 4	GRA 98011	L5	60.9 ± 0.1
GRA 98050	H3	40 ± 4	GRA 98020	L5	48.5 ± 0.1
			GRA 98035	L5	103 ± 6
GRA 98013	H4	82.1 ± 0.3	GRA 98036	L6	1.0 ± 0.1
GRA 98031	H4	50 ± 1	GRA 98041	L6	19 ± 5
GRA 98002	H5	140 ± 2	GRA 98046	L6	36.6 ± 0.2
GRA 98004	H5	16.4 ± 0.2	GRA 98049	L6	9.5 ± 0.1
GRA 98007	H5	55 ± 3	QUE 97555	L6	3.8 ± 0.1
GRA 98008	H5	7.3 ± 0.1	QUE 97431	LL5	0.8 ± 0.3
GRA 98009	H5	55.9 ± 0.3	QUE 97433	LL5	12 ± 2
GRA 98010	H5	92.9 ± 0.6	QUE 97441	LL5	2.3 ± 0.5
GRA 98012	H5	1.4 ± 0.1	QUE 97490	LL5	4.4 ± 0.2
GRA 98014	H5	176.1 ± 0.3	QUE 97524	LL5	5.7 ± 0.1
GRA 98015	H5	40.7 ± 0.1	QUE 97525	LL5	3.2 ± 0.4
GRA 98016	H5	37.0 ± 0.3	QUE 97575	LL5	56.6 ± 0.1
			QUE 97612	LL5	8.2 ± 0.3

*n.d. = natural and induced thermoluminescence below detection limits.

COMMENTS: The following comments are based on natural TL data, TL sensitivity, the shape of the induced TL glow curve, classifications, and JSC and Arkansas sample descriptions.

Induced TL sensitivity data and the shape of the induced TL glow curve suggest that GRA98023 and GRA98050 are subtype 3.6 and 3.7, respectively.

GRA 98041 (L6) has very low TL sensitivity and may be highly shocked

Pairings confirmed by TL data:

H3: GRA 98050 possibly with GRA 98023.

EUC: GRA 98019, GRA 98037, GRA 98042, GRA 98043, GRA 98054, and GRA 98055 with GRA 98006 (AMN 23:1).

Pairing not confirmed by TL Data:

L6: GRA 98049 with GRA 98046 (AMN 23:1).

Pairings suggested by TL data:

H4: GRA 98031 with GRA 95215 (AMN 21:1)

H5: GRA 98016 with GRA 95202 (AMN 20:2).

H5: GRA 98009, GRA 98015, and GRA 98051 with GRA 98007.

H5: GRA 98014 and GRA98017 with GRA 98002 and possibly with GRA 95201 (AMN 20:2).

H6: GRA 98048 with GRA 98034.

L5: GRA 98020 with GRA 95203 (AMN 20:2)

L6: QUE 97555 with QUE 94623 (AMN 20:1).

LL5: QUE 97431 with QUE 97395 (AMN 23:1)

LL5: QUE 97441, QUE 97490, QUE 97524 and QUE 97525 with the QUE 97016 group (AMN 22:2).

LL5: QUE 97443 with QUE 97403 (AMN 23:1).

Sample Request Guidelines

All sample requests should be made in writing to:

**Meteorite Curator/SN2
NASA Johnson Space Center
Houston, TX 77058 USA**

Requests that are received by the Curator before **Oct. 6, 2000**, will be reviewed at the MWG meeting on **Oct. 20-21, 2000**, to be held in Washington D.C. Requests that are received after the **Oct. 6** deadline may possibly be delayed for review until the MWG meets again in the Spring of 2001. **PLEASE SUBMIT YOUR REQUESTS ON TIME.** Questions pertaining to sample requests can be directed in writing to the above address or can be directed to the curator by phone, FAX, or e-mail.

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 be initialed or countersigned by a supervising scientist to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. Those requests that do

not meet the JSC Curatorial Guidelines will be reviewed by the Meteorite Working Group (MWG), 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. 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 the appropriate funding agencies. As a matter of policy, U.S. Antarctic meteorites are the property of the National Science Foundation and all allocations are subject to recall.

Each request should accurately refer to meteorite samples by their respective identification numbers. Specific requirements for sample types within individual specimens, or special handling or shipping procedures should be explained in each request. Each request should include a brief justification, which should contain: 1) what scientific problem will be addressed; 2) what analytical approach will be used; 3) what sample masses are required; 4) evidence that the proposed analyses can be performed by the requester or

collaborators; and 5) why Antarctic meteorites are best suitable for the investigation. For new or innovative investigations, proposers are encouraged to supply additional detailed information in order to assist the MWG. Requests for thin sections which will be used in destructive procedures such as ion probing, etching, or even repolishing, must be stated explicitly. Consortium requests must be initialed or countersigned by a member of each group in the consortium. All necessary information, in most cases, should be condensable into a one-or two-page letter.

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 Contr. Earth Sci.*: Nos. 23, 24, 26, 28, and 30. A table containing all classifications as of December 1993 is published in *Meteoritics* 29, p. 100-142 and updated as of April 1996 in *Meteoritics and Planetary Science* 31, p. A161-A174.

Antarctic Meteorite Laboratory Contact Numbers

Marilyn Lindstrom
Curator

Mail code SN2
NASA Johnson Space Center
Houston, Texas 77058

(281) 483-5135

marilyn.m.lindstrom1@jsc.nasa.gov

Cecilia Satterwhite
Lab Manager

Mail code SN2
NASA Johnson Space Center
Houston, Texas 77058

(281) 483-6776

cecilia.e.satterwhite1@jsc.nasa.gov

Kimberly Cyr
MWG Secretary

Mail code SN2
NASA Johnson Space Center
Houston, Texas 77058

(281) 483-5331

kimberly.e.cyr1@jsc.nasa.gov

FAX: (281) 483-5347

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/curator/antmet/antmet.htm
JSC Curator, martian meteorites	http://www-curator.jsc.nasa.gov/curator/antmet/marsmets/contents.htm
JSC Curator, Mars Meteorite Compendium	http://www-curator.jsc.nasa.gov/curator/antmet/mmc/mmc.htm
Antarctic collection	http://www.cwru.edu/affil/ansmet
LPI martian meteorites	http://cass.jsc.nasa.gov/lpi/meteorites/mars_meteorite.html
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
BMNH general meteorites	http://www.nhm.ac.uk/mineralogy/collections/meteor.htm
UHI planetary science discoveries	http://www.soest.hawaii.edu/PSRdiscoveries
Meteoritical Society	http://www.uark.edu/studorg/metsoc
Meteorite! Magazine	http://www.meteor.co.nz
Geochemical Society	http://www.geochemsoc.org

Mailing List Form

*If you wish to receive future issues please send this form back to the address listed below or e-mail the person listed. Please fill out the form completely including your e-mail address. If you **do not** wish to remain on the paper distribution list for the Antarctic Meteorite Newsletter you need take no action.*

.....

Please keep me on the Antarctic Meteorite Newsletter mailing list.

Name: _____

Street Address: _____

City: _____ State: _____

Country: _____ Zip Code: _____

e-mail: _____

Phone: _____ Fax: _____

.....

Send to: Cecilia Satterwhite
NASA/JSC
Mail Code SN2
2101 Nasa Road 1
Houston, Texas 77058

Or e-mail the information to: cecilia.e.satterwhite1@jsc.nasa.gov

