

# Antarctic Meteorite NEWSLETTER

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**February 1995**

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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**SAMPLE REQUEST DEADLINE:  
February 22, 1995**

**MWG MEETS March 17-18, 1995**

## SAMPLE REQUEST GUIDELINES

All sample requests should be made in writing to:

Secretary, MWG  
SN2/Office of the Curator  
NASA/Johnson Space Center  
Houston, TX 77058 USA.

Requests that are received by the MWG Secretary before Feb. 22, 1995, will be reviewed at the MWG meeting on Mar. 17-18, 1995, to be held in Houston, Texas. Requests that are received after the Feb. 22 deadline may possibly be delayed for review until the MWG meets again in the Fall of 1995. **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 (published in this issue), 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 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. Requests for thin sections which will be used in destructive procedures such as ion probe, etch or even repolishing, must be stated explicitly. Consortium requests should be initialed or countersigned by a member of each group in the consortium. All necessary information should probably be condensable into a one- or two-page letter, although informative attachments (reprints of publication that explain rationale, flow diagrams for analyses, etc.) are welcome.

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 classification as of December 1993 is published in Meteoritics 29(1) p. 100-142.

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**New Meteorites**

This newsletter presents classifications of 396 meteorites from the 1993 ANSMET collection. The new meteorites include 2 mesosiderites, 1 lodranite, 2 ureilites, 1 CV3 carbonaceous chondrite, 2 enstatite chondrites, and 3 unequilibrated ordinary chondrites.

**ANSMET**

News from the 1994 Antarctic field team is that 579 meteorites were collected in the Foggy Bottom region in Queen Alexandra Range and 21 from Allan Hills were picked up by two members of a geologic field party. A reconnaissance trip to the Byrd and Darwin Glaciers may have added a few more to the collection. Although most of the specimens are small, ordinary chondrites, there are a few interesting ones in this collection. Stay tuned!

**Meteorites On-Line**

We are excited to announce that the Curatorial Facility is now part of the JSC Home Page on the World Wide Web. It is our intention to provide the most current Antarctic Meteorite Newsletter along with photographs, where possible, using this medium. Eileen Stansbery and Claire Dardano have written an article on how you can access this information plus other pertinent information on accessing the Curatorial Databases via Internet, Decnet, and modem. This is presented on pages 19 and 20.

An updated version of the table originally published in the Meteoritical Bulletin is available. You may obtain this by **ANONYMOUS FTP ACCESS** to **CURATE.JSC.NASA.GOV**.

| <b>Information on the U.S. Collection of Antarctic Meteorites</b> |      |
|---|------|
| Number of meteorites:   | 7037 |
| Number of meteorites classified:                                  | 6449 |

## From 1993 Collection

Pages 5-16 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 17(3) (August 1994). 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 petrologic 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
- DAV — David Glacier
- DOM — Dominion Range
- DRP — Derrick Peak
- EET — Elephant Moraine
- GEO — Geologists Range
- GRO — Grosvenor Mountains
- HOW — Mt. Howe
- ILD — Inland Forts
- LAP — LaPaz Ice Field
- LEW — Lewis Cliff
- MAC — MacAlpine Hills
- MBR — Mount Baldr
- MCY — MacKay Glacier
- MET — Meteorite Hills
- MIL — Miller Range
- OTT — Outpost Nunatak
- PAT — Patuxent Range
- PCA — Pecora Escarpment
- PGP — Purgatory Peak
- QUE — Queen Alexandra Range
- RKP — Reckling Peak
- STE — Stewart Hills
- TIL — Thiel Mountains
- TYR — Taylor Glacier
- WIS — Wisconsin Range

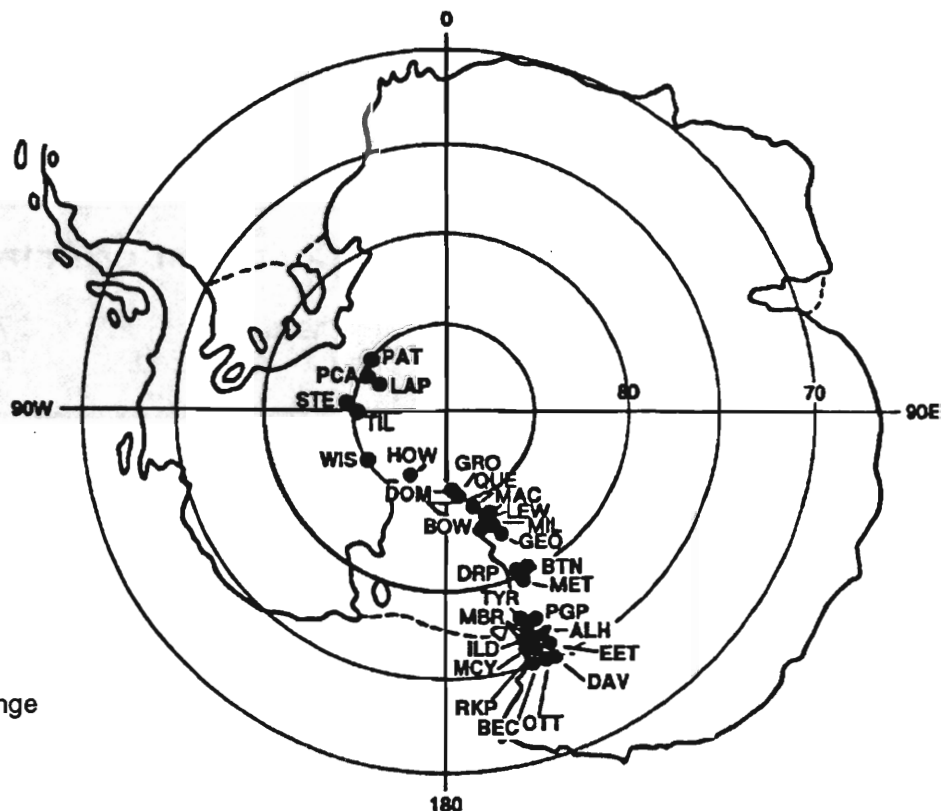


TABLE 1

## List of Newly Classified Antarctic Meteorites \*\*

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---------------|------------|----------------|------------|------------|------|------|
| LEW 93800     | 285.9      | L5 CHONDRITE   | A/B        | A/B        | 25   | 21   |
| LEW 93801     | 226.5      | H5 CHONDRITE   | B/C        | A/B        | 19   | 17   |
| LEW 93802     | 116.6      | H5 CHONDRITE   | B/Ce       | A/B        | 19   | 17   |
| LEW 93803~    | 3.5        | L6 CHONDRITE   | A/B        | A          |      |      |
| LEW 93804~    | 80.8       | L6 CHONDRITE   | A/B        | A          |      |      |
| LEW 93805~    | 85.7       | L6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93806~    | 37.7       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93807~    | 4.0        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93808     | 29.6       | H5 CHONDRITE   | B/C        | A/B        | 18   | 16   |
| LEW 93809     | 9.8        | L5 CHONDRITE   | B/C        | A          | 24   | 20   |
| LEW 93810     | 11.1       | H5 CHONDRITE   | B/C        | A          | 19   | 17   |
| LEW 93812~    | 2.6        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93813~    | 1.1        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93814~    | 1.0        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93815     | 19.2       | H5 CHONDRITE   | B/C        | A          | 19   | 17   |
| LEW 93816~    | 5.4        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93817~    | 6.8        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93818     | 20.1       | H5 CHONDRITE   | B/C        | A          | 19   | 17   |
| LEW 93819~    | 0.5        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93820~    | 13.1       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93821~    | 7.7        | H6 CHONDRITE   | B/Ce       | A          |      |      |
| LEW 93822~    | 14.1       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93823~    | 7.0        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93824~    | 14.3       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93825     | 14.2       | H5 CHONDRITE   | C          | A          | 19   | 17   |
| LEW 93826~    | 15.1       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93827~    | 0.4        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93828~    | 9.0        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93829~    | 6.1        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93830~    | 20.2       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93831~    | 6.2        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93832~    | 3.1        | H6 CHONDRITE   | B/Ce       | A          |      |      |
| LEW 93833~    | 4.9        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93834~    | 3.9        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93835~    | 10.9       | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93836~    | 8.5        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93837~    | 12.5       | L6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93838     | 37.3       | H5 CHONDRITE   | B/C        | A/B        | 19   | 17   |
| LEW 93839     | 14.8       | H5 CHONDRITE   | B/Ce       | A          | 17   | 15   |
| LEW 93840~    | 3.6        | H6 CHONDRITE   | B/Ce       | A          |      |      |
| LEW 93841     | 2.9        | H5 CHONDRITE   | B/C        | A          | 18   | 16   |
| LEW 93843     | 16.1       | H5 CHONDRITE   | B/C        | A          | 19   | 17   |
| LEW 93844~    | 4.1        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93845     | 5.0        | H5 CHONDRITE   | B/C        | A          | 18   | 16   |
| LEW 93846~    | 2.6        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93847     | 47.7       | H5 CHONDRITE   | C          | A          | 19   | 17   |
| LEW 93848     | 8.4        | H5 CHONDRITE   | B/C        | A          | 19   | 17   |
| LEW 93849~    | 2.4        | H6 CHONDRITE   | B/C        | A          |      |      |
| LEW 93850~    | 1.2        | H6 CHONDRITE   | B          | A          |      |      |
| LEW 93851     | 4.9        | LL5 CHONDRITE  | B          | A          | 28   | 23   |

~Classified by using refractive indices.

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs  |
|---------------|------------|----------------|------------|------------|------|-------|
| LEW 93852     | 10.3       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| LEW 93853~    | 3.3        | H6 CHONDRITE   | Be         | A          |      |       |
| LEW 93854     | 31.1       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| LEW 93855~    | 4.4        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93856~    | 7.4        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93857~    | 5.9        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93858~    | 2.7        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93859~    | 3.0        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93860~    | 6.4        | H6 CHONDRITE   | B/C        | A          |      |       |
| LEW 93861     | 8.4        | H5 CHONDRITE   | B/Ce       | A          | 19   | 17    |
| LEW 93862~    | 4.9        | H6 CHONDRITE   | B/Ce       | A          |      |       |
| LEW 93863~    | 6.6        | H6 CHONDRITE   | B/C        | A          |      |       |
| LEW 93864     | 8.2        | L5 CHONDRITE   | A/B        | A          | 24   | 20    |
| LEW 93865~    | 14.8       | L6 CHONDRITE   | B/C        | A          |      |       |
| LEW 93866     | 9.0        | LL5 CHONDRITE  | B/Ce       | A          | 27   | 22    |
| LEW 93867~    | 11.4       | H6 CHONDRITE   | B/Ce       | A          |      |       |
| LEW 93868~    | 4.4        | H6 CHONDRITE   | B/C        | A          |      |       |
| LEW 93869~    | 2.2        | H6 CHONDRITE   | B/C        | A          |      |       |
| LEW 93870     | 22.6       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| LEW 93871~    | 15.0       | H6 CHONDRITE   | B/C        | A          |      |       |
| LEW 93872~    | 3.2        | H6 CHONDRITE   | B/C        | B          |      |       |
| LEW 93873     | 3.7        | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| LEW 93874~    | 1.7        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93875     | 12.5       | H5 CHONDRITE   | B/Ce       | A          | 19   | 17    |
| LEW 93876~    | 8.7        | L6 CHONDRITE   | B          | A          |      |       |
| LEW 93877~    | 2.9        | LL6 CHONDRITE  | A/B        | A          |      |       |
| LEW 93878~    | 4.2        | LL6 CHONDRITE  | B          | A          |      |       |
| LEW 93879~    | 2.8        | L6 CHONDRITE   | B          | A          |      |       |
| LEW 93880~    | 1.4        | L6 CHONDRITE   | B          | A          |      |       |
| LEW 93881     | 11.3       | H5 CHONDRITE   | B          | A          | 19   | 17    |
| LEW 93882     | 36.7       | H5 CHONDRITE   | B/C        | A          | 18   | 16    |
| LEW 93883~    | 3.7        | H6 CHONDRITE   | B          | A          |      |       |
| LEW 93884~    | 12.7       | L6 CHONDRITE   | B          | A          |      |       |
| LEW 93885~    | 8.2        | L6 CHONDRITE   | B          | A          |      |       |
| LEW 93886     | 5.6        | H4 CHONDRITE   | B          | A          | 18   | 16-19 |
| LEW 93888     | 10.9       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| LEW 93889     | 3.0        | H5 CHONDRITE   | B          | A          | 18   | 16    |
| LEW 93891     | 25.5       | L3.7 CHONDRITE | B/C        | A/B        | 6-20 | 4-23  |
| LEW 93895~    | 1.0        | H5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93013     | 1993.7     | H5 CHONDRITE   | B/C        | A/B        | 19   | 17    |
| QUE 93014     | 1767.2     | H6 CHONDRITE   | A/B        | A/B        | 18   | 16    |
| QUE 93015~    | 2502.0     | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93016~    | 1979.6     | L6 CHONDRITE   | B          | A          |      |       |
| QUE 93019     | 2570.0     | L6 CHONDRITE   | A/B        | A          | 24   | 20    |
| QUE 93020     | 597.3      | L5 CHONDRITE   | A/B        | A          | 27   | 22    |
| QUE 93021     | 2100.3     | L5 CHONDRITE   | B/Ce       | A          | 23   | 19    |
| QUE 93022     | 2202.3     | H5 CHONDRITE   | C          | B/C        | 19   | 17    |
| QUE 93023     | 957.1      | H5 CHONDRITE   | C          | C          | 19   | 17    |
| QUE 93024     | 708.2      | H5 CHONDRITE   | C          | C          | 18   | 16    |
| QUE 93025     | 626.1      | H5 CHONDRITE   | B/C        | B          | 19   | 17    |
| QUE 93026     | 1258.7     | H5 CHONDRITE   | B/Ce       | C          | 19   | 17    |
| QUE 93027     | 1109.6     | H5 CHONDRITE   | Be         | A/B        | 19   | 17    |
| QUE 93028     | 698.7      | H5 CHONDRITE   | B          | A          | 18   | 16    |
| QUE 93029     | 723.8      | H5 CHONDRITE   | B          | A          | 18   | 16    |
| QUE 93030     | 896.9      | H3.6 CHONDRITE | B/C        | A/B        | 6-20 | 11-17 |
| QUE 93031     | 233.4      | L5 CHONDRITE   | B          | A          | 27   | 22    |

-Classified by using refractive indices.

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs  |
|---------------|------------|----------------|------------|------------|------|-------|
| QUE 93032     | 418.0      | L5 CHONDRITE   | B          | A          | 27   | 22    |
| QUE 93033     | 513.4      | H5 CHONDRITE   | B          | A          | 18   | 16    |
| QUE 93034     | 356.8      | H5 CHONDRITE   | A/B        | A          | 18   | 16    |
| QUE 93035     | 329.3      | L5 CHONDRITE   | A/B        | A          | 27   | 22    |
| QUE 93036     | 446.9      | L5 CHONDRITE   | A/B        | A          | 27   | 22    |
| QUE 93037     | 326.9      | L5 CHONDRITE   | A/B        | A/B        | 27   | 22    |
| QUE 93038     | 285.9      | H5 CHONDRITE   | A/B        | A          | 18   | 16    |
| QUE 93039     | 285.9      | L5 CHONDRITE   | A/B        | A          | 27   | 22    |
| QUE 93040     | 346.1      | L5 CHONDRITE   | B          | A          | 26   | 22    |
| QUE 93041~    | 267.9      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93042~    | 274.3      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93043     | 496.8      | H5 CHONDRITE   | B          | B          | 18   | 16    |
| QUE 93044~    | 164.4      | L5 CHONDRITE   | B          | A/B        |      |       |
| QUE 93045~    | 127.8      | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93046     | 163.3      | H5 CHONDRITE   | B          | A          | 18   | 16    |
| QUE 93047~    | 173.9      | L5 CHONDRITE   | B/C        | B/C        |      |       |
| QUE 93048~    | 214.3      | L5 CHONDRITE   | A/Be       | A/B        |      |       |
| QUE 93049     | 317.3      | H5 CHONDRITE   | B          | B          | 18   | 16    |
| QUE 93050     | 145.0      | LL4 CHONDRITE  | B/C        | A/B        | 28   | 21-25 |
| QUE 93051     | 139.4      | H5 CHONDRITE   | B/C        | A/B        | 19   | 17    |
| QUE 93052~    | 164.9      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93053~    | 161.2      | L5 CHONDRITE   | A/B        | A/B        |      |       |
| QUE 93054~    | 183.9      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93055     | 148.6      | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93056~    | 202.4      | L5 CHONDRITE   | A/B        | A/B        |      |       |
| QUE 93057~    | 186.8      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93058~    | 138.2      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93059~    | 189.6      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93060     | 118.5      | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93061~    | 160.4      | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93062~    | 99.0       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93063~    | 185.5      | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93064     | 86.4       | LL5 CHONDRITE  | B          | A          | 28   | 23    |
| QUE 93065~    | 132.6      | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93066     | 66.1       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93067~    | 96.5       | L5 CHONDRITE   | B          | A/B        |      |       |
| QUE 93068~    | 121.4      | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93070~    | 80.5       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93071     | 38.1       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93072~    | 68.7       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93073~    | 81.2       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93074~    | 45.7       | L5 CHONDRITE   | B          | A/B        |      |       |
| QUE 93075~    | 96.2       | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93076~    | 161.5      | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93077~    | 32.2       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93078~    | 3.1        | L5 CHONDRITE   | B/C        | B          |      |       |
| QUE 93079     | 0.5        | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93080~    | 109.2      | L6 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93081     | 42.7       | H4 CHONDRITE   | B/C        | A          | 19   | 15-18 |
| QUE 93082~    | 116.7      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93083     | 8.7        | H4 CHONDRITE   | B/C        | A          | 19   | 15-18 |
| QUE 93084     | 3.3        | H4 CHONDRITE   | B/C        | A          | 19   | 15-18 |
| QUE 93085~    | 1.2        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93086     | 0.4        | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93087~    | 4.1        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93088~    | 2.1        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93089     | 3.4        | H5 CHONDRITE   | B/C        | A          | 18   | 16    |

-Classified by using refractive indices.



| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs  |
|---------------|------------|----------------|------------|------------|------|-------|
| QUE 93090~    | 2.7        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93091~    | 0.6        | H6 CHONDRITE   | C          | A/B        |      |       |
| QUE 93092~    | 2.7        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93093~    | 1.8        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93094~    | 0.5        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93095~    | 1.4        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93096~    | 1.5        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93097~    | 2.2        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93098~    | 1.2        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93099~    | 0.4        | L6 CHONDRITE   | B          | A          |      |       |
| QUE 93100~    | 0.7        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93101~    | 0.6        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93102~    | 3.4        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93103     | 9.2        | H5 CHONDRITE   | B/Ce       | A          | 19   | 17    |
| QUE 93104~    | 0.3        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93105~    | 0.5        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93106~    | 2.6        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93107~    | 5.4        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93108~    | 2.6        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93109~    | 7.7        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93110~    | 0.8        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93111~    | 0.3        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93112~    | 0.8        | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93113~    | 0.3        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93114~    | 2.1        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93115~    | 4.8        | L6 CHONDRITE   | B          | A          |      |       |
| QUE 93116~    | 11.5       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93117~    | 0.3        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93118~    | 1.1        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93119~    | 1.1        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93120~    | 6.4        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93121~    | 2.3        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93122~    | 0.6        | L6 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93123~    | 23.2       | L5 CHONDRITE   | B          | B          |      |       |
| QUE 93124     | 69.7       | H5 CHONDRITE   | B/C        | A          | 18   | 16    |
| QUE 93125~    | 0.7        | H6 CHONDRITE   | C          | A          |      |       |
| QUE 93126     | 2.6        | MESOSIDERITE   | Ce         | B          | -    | 21-55 |
| QUE 93127~    | 2.0        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93128~    | 1.3        | L5 CHONDRITE   | B/C        | B          |      |       |
| QUE 93129     | 7.6        | H4 CHONDRITE   | Ce         | A/B        | 17   | 13-19 |
| QUE 93130~    | 8.7        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93131~    | 3.4        | H5 CHONDRITE   | B/C        | B/C        |      |       |
| QUE 93132~    | 3.0        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93133~    | 0.9        | H5 CHONDRITE   | B          | A          |      |       |
| QUE 93134~    | 0.7        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93135~    | 3.6        | L5 CHONDRITE   | B          | A/B        |      |       |
| QUE 93136~    | 6.9        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93137~    | 0.2        | H5 CHONDRITE   | B          | A          |      |       |
| QUE 93138~    | 1.2        | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93139~    | 0.9        | H5 CHONDRITE   | B          | A          |      |       |
| QUE 93140~    | 11.0       | L6 CHONDRITE   | B          | A          |      |       |
| QUE 93141     | 41.4       | LL5 CHONDRITE  | B          | A          | 27   | 22    |
| QUE 93142     | 29.8       | H5 CHONDRITE   | B/C        | A          | 18   | 16    |
| QUE 93143~    | 27.3       | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93144~    | 15.7       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93145~    | 1.3        | L6 CHONDRITE   | B          | A          |      |       |
| QUE 93146~    | 0.5        | H5 CHONDRITE   | B          | A/B        |      |       |

~Classified by using refractive indices.



| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs  |
|---------------|------------|----------------|------------|------------|------|-------|
| QUE 93147~    | 1.7        | L6 CHONDRITE   | Be         | A          |      |       |
| QUE 93148     | 1.1        | LODRANITE      | B          | A/B        | 15   | 13    |
| QUE 93149~    | 1.1        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93150     | 0.6        | MESOSIDERITE   | B          | B          | -    | 22-50 |
| QUE 93151~    | 8.4        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93152~    | 4.2        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93153~    | 11.6       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93154~    | 2.0        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93155~    | 0.5        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93156~    | 10.4       | L5 CHONDRITE   | B          | B          |      |       |
| QUE 93157     | 3.1        | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93158~    | 0.5        | L6 CHONDRITE   | A/B        | A          |      |       |
| QUE 93159     | 0.2        | H5 CHONDRITE   | B          | A          | 19   | 17    |
| QUE 93160~    | 11.5       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93161     | 4.8        | H4 CHONDRITE   | B/C        | A          | 18   | 12-17 |
| QUE 93162     | 27.4       | L5 CHONDRITE   | B          | B          | 25   | 21    |
| QUE 93163~    | 5.1        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93164~    | 20.8       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93165     | 11.6       | LL5 CHONDRITE  | B          | A          | 27   | 22    |
| QUE 93166~    | 25.1       | L5 CHONDRITE   | B          | A/B        |      |       |
| QUE 93167     | 14.8       | H5 CHONDRITE   | B/C        | A          | 18   | 16    |
| QUE 93168     | 60.2       | LL6 CHONDRITE  | B          | A          | 27   | 22    |
| QUE 93169     | 2.4        | L6 CHONDRITE   | B          | A          | 25   | 21    |
| QUE 93170~    | 0.7        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93171~    | 1.3        | L6 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93172~    | 1.3        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93173~    | 1.6        | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93174~    | 3.3        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93175~    | 24.7       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93176~    | 2.1        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93177~    | 25.8       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93178~    | 60.4       | L5 CHONDRITE   | B/C        | B/C        |      |       |
| QUE 93179~    | 5.9        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93180~    | 11.1       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93181~    | 1.3        | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93182~    | 135.5      | L5 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93183~    | 9.7        | L6 CHONDRITE   | A/B        | A          |      |       |
| QUE 93184~    | 4.3        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93185~    | 0.9        | H5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93186~    | 36.7       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93187~    | 32.5       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93188~    | 32.2       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93189~    | 6.3        | H5 CHONDRITE   | C          | A/B        |      |       |
| QUE 93190     | 9.3        | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93191~    | 63.0       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93192     | 3.9        | LL5 CHONDRITE  | A/B        | A          | 28   | 23    |
| QUE 93193~    | 70.4       | L6 CHONDRITE   | A/B        | A          |      |       |
| QUE 93194~    | 50.8       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93195~    | 56.7       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93196~    | 71.0       | L5 CHONDRITE   | A/B        | A/B        |      |       |
| QUE 93197~    | 105.0      | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93198~    | 11.8       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93199     | 18.1       | H5 CHONDRITE   | B/C        | A          | 19   | 16    |
| QUE 93200~    | 82.2       | L6 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93201~    | 0.3        | H5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93202~    | 4.4        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93203~    | 1.4        | H6 CHONDRITE   | B/C        | A          |      |       |

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| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---------------|------------|----------------|------------|------------|------|------|
| QUE 93204~    | 7.4        | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93205~    | 1.1        | H6 CHONDRITE   | A/B        | A          |      |      |
| QUE 93206~    | 3.6        | H6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93207~    | 0.6        | L6 CHONDRITE   | B          | A          |      |      |
| QUE 93208~    | 4.8        | H5 CHONDRITE   | B/C        | A          |      |      |
| QUE 93209~    | 3.6        | L6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93210     | 4.7        | H5 CHONDRITE   | Ce         | A/B        | 19   | 17   |
| QUE 93211~    | 21.2       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93212     | 30.7       | H5 CHONDRITE   | C          | A          | 19   | 17   |
| QUE 93213~    | 12.6       | H5 CHONDRITE   | C          | A          |      |      |
| QUE 93214~    | 16.9       | H5 CHONDRITE   | C          | A          |      |      |
| QUE 93215     | 12.6       | H5 CHONDRITE   | C          | A          | 19   | 17   |
| QUE 93216~    | 53.2       | L5 CHONDRITE   | B/C        | A          |      |      |
| QUE 93217~    | 8.1        | H5 CHONDRITE   | C          | A          |      |      |
| QUE 93218~    | 2.5        | H5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93219     | 38.9       | H5 CHONDRITE   | C          | A          | 18   | 16   |
| QUE 93220~    | 83.9       | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93221     | 53.5       | H5 CHONDRITE   | B/C        | A          | 18   | 16   |
| QUE 93222~    | 119.5      | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93223~    | 30.3       | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93224~    | 45.8       | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93225~    | 73.1       | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93226~    | 3.9        | H5 CHONDRITE   | B/C        | A          |      |      |
| QUE 93227~    | 4.6        | L6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93228~    | 121.5      | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93229~    | 52.1       | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93230~    | 77.2       | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93231~    | 111.5      | L5 CHONDRITE   | A/B        | A          |      |      |
| QUE 93232~    | 10.6       | H6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93233~    | 8.9        | H6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93234~    | 9.0        | H5 CHONDRITE   | B/Ce       | A          |      |      |
| QUE 93235     | 9.1        | LL5 CHONDRITE  | B/C        | A          | 29   | 24   |
| QUE 93236~    | 4.1        | H6 CHONDRITE   | B/Ce       | A          |      |      |
| QUE 93237~    | 1.4        | H6 CHONDRITE   | B/Ce       | A          |      |      |
| QUE 93238~    | 27.8       | H6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93239~    | 18.6       | L6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93240~    | 52.2       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93241~    | 26.7       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93242     | 22.2       | H6 CHONDRITE   | C          | A/B        | 19   | 17   |
| QUE 93243~    | 21.0       | H5 CHONDRITE   | C          | A          |      |      |
| QUE 93244~    | 53.4       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93245~    | 124.7      | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93246~    | 21.3       | L6 CHONDRITE   | C          | A          |      |      |
| QUE 93247~    | 68.3       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93248~    | 3.4        | L6 CHONDRITE   | B/C        | A          |      |      |
| QUE 93249~    | 29.4       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93250~    | 20.6       | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93251~    | 37.2       | L5 CHONDRITE   | B/C        | A          |      |      |
| QUE 93252~    | 0.1        | L5 CHONDRITE   | B/C        | A          |      |      |
| QUE 93253     | 3.8        | H5 CHONDRITE   | C          | A          | 19   | 17   |
| QUE 93254~    | 0.6        | L5 CHONDRITE   | B/C        | A          |      |      |
| QUE 93255     | 9.9        | H5 CHONDRITE   | B/C        | A          | 19   | 17   |
| QUE 93256~    | 1.4        | L6 CHONDRITE   | C          | A          |      |      |
| QUE 93257~    | 3.5        | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93258~    | 8.2        | L5 CHONDRITE   | B          | A          |      |      |
| QUE 93259     | 3.8        | H5 CHONDRITE   | B/C        | A          | 18   | 16   |
| QUE 93260~    | 24.4       | L5 CHONDRITE   | A/B        | A          |      |      |

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| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs  |
|---------------|------------|----------------|------------|------------|------|-------|
| QUE 93261~    | 4.3        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93262~    | 7.4        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93263~    | 39.7       | L5 CHONDRITE   | A/B        | A/B        |      |       |
| QUE 93264~    | 96.1       | L6 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93265~    | 48.5       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93266~    | 43.2       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93267     | 8.5        | H5 CHONDRITE   | B/C        | A          | 18   | 16    |
| QUE 93268     | 6.6        | H5 CHONDRITE   | B/C        | A          | 19   | 16    |
| QUE 93269~    | 20.4       | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93300     | 35.6       | H5 CHONDRITE   | B/C        | A          | 18   | 16    |
| QUE 93301~    | 13.0       | H5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93302~    | 37.7       | H5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93303~    | 35.1       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93304~    | 41.1       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93305~    | 97.6       | L5 CHONDRITE   | B          | B/C        |      |       |
| QUE 93306~    | 7.8        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93307~    | 62.4       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93308~    | 19.4       | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93309     | 8.4        | L3.5 CHONDRITE | B/Ce       | A          | 7-28 | 6-26  |
| QUE 93310     | 6.6        | H5 CHONDRITE   | B/C        | A          | 19   | 16    |
| QUE 93311~    | 12.4       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93312~    | 5.0        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93313~    | 3.8        | L5 CHONDRITE   | B/C        | A/B        |      |       |
| QUE 93314     | 5.4        | H5 CHONDRITE   | C          | A          | 19   | 17    |
| QUE 93315     | 2.7        | H6 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93316     | 1.5        | L4 CHONDRITE   | B/C        | A          | 23   | 20-23 |
| QUE 93317~    | 5.9        | L5 CHONDRITE   | B/C        | C          |      |       |
| QUE 93318     | 13.5       | LL6 CHONDRITE  | B          | A          | 31   | 26    |
| QUE 93319     | 6.0        | H5 CHONDRITE   | C          | A          | 19   | 17    |
| QUE 93320~    | 1.0        | H6 CHONDRITE   | B/Ce       | B          |      |       |
| QUE 93321~    | 1.7        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93322     | 13.7       | H5 CHONDRITE   | B/C        | A          | 19   | 17    |
| QUE 93323~    | 0.7        | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93324~    | 1.2        | L5 CHONDRITE   | B          | B          |      |       |
| QUE 93325~    | 1.4        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93326~    | 2.7        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93327~    | 1.7        | L5 CHONDRITE   | B/Ce       | A          |      |       |
| QUE 93328~    | 0.6        | L5 CHONDRITE   | Be         | A          |      |       |
| QUE 93329~    | 1.8        | L6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93330~    | 56.8       | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93331~    | 0.7        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93332~    | 0.9        | L5 CHONDRITE   | B          | A          |      |       |
| QUE 93333     | 6.4        | H5 CHONDRITE   | B          | A          | 19   | 17    |
| QUE 93334~    | 9.2        | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93335     | 4.8        | H5 CHONDRITE   | B          | A          | 19   | 17    |
| QUE 93336     | 1.9        | UREILITE       | B/C        | A          | 23   | 18    |
| QUE 93337     | 9.9        | H6 CHONDRITE   | B          | A          | 19   | 17    |
| QUE 93338~    | 1.7        | L5 CHONDRITE   | A/B        | A          |      |       |
| QUE 93339~    | 4.1        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93340~    | 2.9        | H6 CHONDRITE   | B/C        | A          |      |       |
| QUE 93341     | 7.5        | UREILITE       | B          | A          | 23   | 18    |
| QUE 93342     | 11.1       | L5 CHONDRITE   | B/C        | A          | 26   | 21    |
| QUE 93343~    | 51.2       | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93344~    | 53.6       | L5 CHONDRITE   | B/C        | A          |      |       |
| QUE 93345     | 10.0       | H6 CHONDRITE   | B          | A          | 18   | 16    |
| QUE 93346~    | 4.5        | H6 CHONDRITE   | B          | A          |      |       |
| QUE 93347     | 5.5        | H5 CHONDRITE   | B          | A          | 18   | 16    |

-Classified by using refractive indices.

| Sample Number | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs |
|---------------|------------|----------------|------------|------------|------|------|
| QUE 93348     | 6.5        | H5 CHONDRITE   | B/C        | A          | 18   | 16   |
| QUE 93349~    | 0.5        | H6 CHONDRITE   | B          | A          |      |      |
| QUE 93351     | 4.7        | E3 CHONDRITE   | B/C        | A          |      | 0-10 |
| QUE 93372     | 7.4        | E5 CHONDRITE   | B          | B          |      | 0-1  |
| QUE 93429     | 7.8        | CV3 CHONDRITE  | B/Ce       | B          | 0-10 | 1-6  |

**\*\*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.*

-Classified by using refractive indices.

TABLE 2

## Newly Classified Specimens Listed By Type \*\*

| Sample Number                  | Weight (g) | Classification | Weathering | Fracturing | % Fa | % Fs  |
|--------------------------------|------------|----------------|------------|------------|------|-------|
| <b>Achondrites</b>             |            |                |            |            |      |       |
| QUE 93336                      | 1.9        | UREILITE       | B/C        | A          | 23   | 18    |
| QUE 93341                      | 7.5        | UREILITE       | B          | A          | 23   | 18    |
| <b>Carbonaceous Chondrites</b> |            |                |            |            |      |       |
| QUE 93429                      | 7.8        | CV3 CHONDRITE  | B/Ce       | B          | 0-10 | 1-6   |
| <b>Chondrites - Type 3</b>     |            |                |            |            |      |       |
| QUE 93030                      | 896.9      | H3.6 CHONDRITE | B/C        | A/B        | 6-20 | 11-17 |
| QUE 93309                      | 8.4        | L3.5 CHONDRITE | B/Ce       | A          | 7-28 | 6-26  |
| LEW 93891                      | 25.5       | L3.7 CHONDRITE | B/C        | A/B        | 6-20 | 4-23  |
| <b>E Chondrites</b>            |            |                |            |            |      |       |
| QUE 93351                      | 4.7        | E3 CHONDRITE   | B/C        | A          |      | 0-10  |
| QUE 93372                      | 7.4        | E5 CHONDRITE   | B          | B          |      | 0-1   |
| <b>Stony-Irons</b>             |            |                |            |            |      |       |
| QUE 93148                      | 1.1        | LODRANITE      | B          | A/B        | 15   | 13    |
| QUE 93126                      | 2.6        | MESOSIDERITE   | Ce         | B          | -    | 21-55 |
| QUE 93150                      | 0.6        | MESOSIDERITE   | B          | B          | -    | 22-50 |

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-Classified by using refractive indices.

**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 (1994).

**MESOSIDERITE**

QUE 93126, 93150 with QUE 86900.

**UREILITE**

QUE 93336, 93341.

**H4 CHONDRITE**

QUE 93081, 93083, 93084.

**H5 CHONDRITE**

QUE 93029, 93038, 93043, 93049.

**L5 CHONDRITE**

QUE 93020, 93031, 93032, 93035, 93036, 93037, 93039, 93041, 93042, 93044, 93045, 93047, 93048, 93052, 93053, 93054, 93056, 93057, 93058, 93059, 93061, 93062, 93063, 93065, 93067, 93068, 93070, 93072, 93073, 93074, 93076, 93077, 93078, 93082, 93087, 93092, 93095, 93096, 93108, 93109, 93112, 93113, 93116, 93118, 93119, 93120, 93123, 93127, 93128 with QUE 90201.

## PETROGRAPHIC DESCRIPTIONS

**Sample No.:** LEW93891  
**Location:** Lewis Cliff  
**Dimensions (cm):** 2.8 x 2.6 x 1.5  
**Weight (g):** 25.5  
**Meteorite Type:** L3 Chondrite  
(estimated L3.7)

Macroscopic Description: Cecilia Satterwhite

Ninety percent of the exterior of this unequilibrated ordinary chondrite is covered with pitted, brownish-black fusion crust. The interior is dark gray to brown. Metal occurrence is low. There are abundant chondrules visible and most are heavily weathered.

Thin Section (.2) Description: Brian Mason

The section shows numerous chondrules (up to 2.2 mm across), chondrule fragments, and mineral grains in a dark brown to black matrix which contains minor amounts of nickel-iron and troilite. Brown limonitic staining pervades the section. Microprobe analyses show a wide range of olivine and pyroxene compositions: olivine, Fa<sub>6-20</sub>, mean Fa<sub>15</sub>; pyroxene, Fs<sub>4-23</sub>. The meteorite is an L3 chondrite (estimated L3.7).

**Sample No.:** QUE93030  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 9.2 x 7.0 x 7.4  
**Weight (g):** 896.9  
**Meteorite Type:** H3 Chondrite  
(estimated H3.6)

Macroscopic Description: Cecilia Satterwhite

QUE93030 is mostly covered with black fusion crust. Some exterior surfaces are pitted; some have oxidation haloes. Areas devoid of fusion crust are brown and small inclusions are visible. Cleaving this chondrite revealed a medium gray matrix with yellowish-brown oxidation uniformly scattered throughout. A thick dark brown oxidation rind is present. Only a few light and dark inclusions are discernible.

Thin Section (.2) Description: Brian Mason

The section shows numerous chondrules (up to 1.5 mm across), chondrule fragments, and mineral grains in a dark brown to black matrix. Nickel-iron grains are abundant in the matrix; troilite is present in lesser amounts. The meteorite is severely weathered. Microprobe analyses show a wide range in olivine and pyroxene compositions: olivine, Fa<sub>6-20</sub>, mean Fa<sub>14</sub>; pyroxene, Fs<sub>11-17</sub>. The variable olivine and pyroxene compositions indicate type 3, and the amount of nickel-iron H group; the meteorite is therefore classified as an H3 chondrite (estimated H3.6).

**Sample No.:** QUE93148  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 1.0 x 0.8 x 0.5  
**Weight (g):** 1.1  
**Meteorite Type:** Lodranite

Macroscopic Description: Robbie Marlow

Only twenty percent of the dull, weathered, brownish-black fusion crust remains on this specimen. The interior matrix is a rich dark amber color. The crystalline texture is coarse-grained.

Thin Section (.2) Description: Brian Mason

The section shows an irregular grain of nickel-iron, 3 mm across, partly surrounded by anhedral grains of olivine and orthopyroxene, 0.3-0.9 mm across. Fusion crust is present along one edge. Olivine composition is Fa<sub>15</sub>, pyroxene composition Wo<sub>2</sub>Fs<sub>13</sub>. The meteorite is a lodranite.

**Sample No.:** QUE93309  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 2.4 x 1.8 x 1.1  
**Weight (g):** 8.4  
**Meteorite Type:** L3 Chondrite  
(estimated L3.5)

Macroscopic Description: Robbie Marlow

Shiny, smooth, dark-brown fusion crust covers ninety-five percent of the exterior of this chondrite. The interior is composed of weathered, brownish-black matrix. Oxidation is extensive and evaporite deposit was noted in the interior.

Thin Section (.2) Description: Brian Mason

The section shows numerous chondrules (up to 2.4 mm across), chondrule fragments, and mineral grains in a small amount of black matrix. The meteorite is severely weathered, with only traces of nickel-iron and troilite remaining. Microprobe analyses show a wide range in olivine and pyroxene compositions: olivine, Fa<sub>7-28</sub>, mean Fa<sub>14</sub>; pyroxene, Fs<sub>6-26</sub>. The meteorite is classified as an L3 Chondrite (estimated L3.5).

**Sample No.:** QUE93336; 93341  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 1.8 x 0.8 x 0.7;  
3.0 x 1.7 x 1.2  
**Weight (g):** 1.9; 7.5  
**Meteorite Type:** Ureilite

Macroscopic Description: Robbie Marlow

Both of these small specimens are identical. The small amount of fusion crust that remains is dull and dark brown. The rest of the exterior surfaces



have a polished, waxy appearance. The brownish-gray interior shows abundant crystal faces.

Thin Section (QUE93336.2: 93341.2)

Description: Brian Mason

The sections are so similar that the meteorites are certainly paired. They show anhedral grains of olivine and pyroxene in a black matrix. Considerable weathering is indicated by brown limonite rimming many grains. In reflected light the margins of the silicate grains are seen to contain numerous minute metal grains, probably the product of reduction from their iron content by the carbonaceous matrix. During polishing the probable presence of microscopic diamonds in the matrix was noted. Microprobe analyses show that most of the olivine and pyroxene has uniform composition; olivine,  $Fa_{23}$ ; pyroxene  $Wo_{10}Fs_{18}$ ; but the margins of the grains show greatly reduced iron contents. The meteorite is a ureilite, and appears to be relatively unshocked.

**Sample No.:** QUE93351  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 1.8 x 1.5 x 0.9  
**Weight (g):** 4.7  
**Meteorite Type:** E3 chondrite

Macroscopic Description: Cecilia Satterwhite

Forty percent of the exterior of this chondrite is covered with brown/black fusion crust. Areas devoid of fusion crust have a polished look. The interior matrix is dark brown to black. Metal is visible. The areas that are oxidized are a yellowish-brown.

Thin Section (.2) Description: Brian Mason

The section shows an aggregate of chondrules and chondrule fragments, up to 1.8 mm across, and mineral grains in a moderate amount of dark matrix. The chondrules and mineral grains consist almost entirely of pyroxene, with possible traces of olivine. The matrix contains a considerable amount of nickel-iron and minor sulfides. Weathering is extensive, with veinlets and patches of brown limonite throughout the section. Microprobe analyses show that most of the pyroxene is close to  $MgSiO_3$  in composition, but a few more iron-rich grains were analyzed. The nickel-iron contains 0.5-1.1% Si. The meteorite is classified as an E3 chondrite.

**Sample No.:** QUE93372  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 2.0 x 1.5 x 1.5  
**Weight (g):** 7.4  
**Meteorite Type:** E5 chondrite

Macroscopic Description: Carol Schwarz

Approximately 50% thin, shiny, and iridescent fusion crust remains on the exterior of QUE93372. The interior matrix has areas of white/rusty material and medium gray material. Metal is dense in the gray areas but less concentrated in the white and rusty areas. Weathering is moderate.

Thin Section (.2) Description: Brian Mason

The section shows a granular aggregate of pyroxene, with considerable nickel-iron and minor sulfides. A few chondrules can be recognized, but their margins are largely integrated with the matrix. The meteorite is moderately weathered, with some limonitic staining throughout the section. Microprobe analyses show that the pyroxene is essentially pure  $MgSiO_3$ ; the metal contains 2.7% Si. The meteorite is classified as an E5 chondrite.

**Sample No.:** QUE93429  
**Location:** Queen Alexandra Range  
**Dimensions (cm):** 2.0 x 1.7 x 1.0  
**Weight (g):** 7.8  
**Meteorite Type:** CV3 chondrite

Macroscopic Description: Carol Schwarz

Fusion crust is dull, black, and has a rough texture. The interior matrix is dark gray/black and fine-grained. Some metal is present. Evaporite deposit is abundant; it is mostly white along the edge of the fusion crust and red-brown or yellowish in the interior.

Thin Section (.2) Description: Brian Mason

The section shows numerous chondrules and irregular aggregates, up to 2.4 mm across, in a black matrix. A minor amount of fine-grained metal and troilite is present, mainly concentrated within chondrules. Brown limonitic staining pervades the section. Microprobe analyses show that most of the olivine in the chondrules is close to  $Mg_2SiO_4$  in composition, but ranges up to  $Fa_{10}$ ; pyroxene composition is  $Fs_{1-6}$ . The matrix appears to consist largely of iron-rich olivine, about  $Fa_{50}$ . The meteorite is classified as a C3 chondrite of the Vigarano subtype.

## Natural Thermoluminescence (NTL) Data for Antarctic Meteorites

Paul Benoit, Joyce Roth, Hazel Sears, and Derek Sears  
 Cosmochemistry Group  
 Dept. of Chemistry and Biochemistry  
 University of Arkansas  
 Fayetteville, AR 72701

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 below that which can reasonably be ascribed to long terrestrial ages. Such meteorites have had their TL lowered by heating within the past million years or so (by close solar passage, shock heating, or atmospheric entry), exacerbated, in the case of certain achondrite classes, by "anomalous fading".

| Sample    | Class | NTL<br>[krad at<br>250 deg. C] | Sample    | Class | NTL<br>[krad at<br>250 deg. C] |
|-----------|-------|--------------------------------|-----------|-------|--------------------------------|
| QUE 93001 | MESO  | 2.2 ± 0.5                      | EET 90610 | L6    | 8.4 ± 0.1                      |
| QUE 93011 | H4    | 64.2 ± 0.7                     | EET 92051 | L6    | 30 ± 2                         |
| QUE 93012 | H6    | 31.2 ± 0.5                     | EET 92055 | L6    | 50.8 ± 0.7                     |
| ALH 90405 | L4    | 5.5 ± 0.1                      | EET 92059 | L6    | 52.8 ± 0.8                     |
|           |       |                                | RKP 92407 | L6    | 33.5 ± 0.2                     |
|           |       |                                | RKP 92408 | L6    | 89 ± 2                         |
|           |       |                                | ALH 90401 | LL6   | 17.7 ± 0.1                     |

The quoted uncertainties are the standard deviations shown by replicate measurements of a single aliquot.

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 group sample descriptions.

EET92051 (L6) may be shocked.

1. TL data do not confirm pairing suggested in the Newsletter:

MESO: QUE93001 with QUE86900 group (*AMN* 17:3).

2. Additional Pairings suggested by TL data:

H6: QUE93012 with QUE90223 (*AMN*: 16:1)

L6: EET90610 is possibly paired with the EET87587 group (*JGR* 99, 2073-2085)

L6: EET92059 with EET92055 and possibly with EET87759 (*JGR* 99, 2073-2085).

TABLE 5

**<sup>26</sup>Al ACTIVITY DATA FOR ANTARCTIC METEORITES**

John F. Wacker  
 Battelle, Pacific Northwest Laboratories  
 P.O. Box 999, Mailstop P7-07  
 Richland, Washington 99352

| SPECIMEN NUMBER | CLASS | <sup>26</sup> Al Activity (dpm/kg) | SPECIMEN NUMBER | CLASS | <sup>26</sup> Al Activity (dpm/kg) |
|-----------------|-------|------------------------------------|-----------------|-------|------------------------------------|
| ALH 77292       | L6    | 80.6 ±3.2                          | EET 87555       | L6    | 62.2 ±2.1                          |
| ALH 85031       | H6    | 49.2 ±3.4                          | EET 87556       | L6    | 68.1 ±4.1                          |
| ALH 85034       | L6    | 51.2 ±2.0                          | EET 87557       | L4    | 58.9 ±2.4                          |
| ALH 85046       | L6    | 65.2 ±3.2                          | EET 87558       | L5    | 59.9 ±3.6                          |
| ALH 85062       | L3    | 38.0 ±2.2                          | EET 87564       | L4    | 57.6 ±2.9                          |
| ALH 85097       | H5    | 49.0 ±4.1                          | EET 87566       | L6    | 56.3 ±2.4                          |
| ALH 85104       | H5    | 48.6 ±4.3                          | EET 87573       | L4    | 47.6 ±3.3                          |
| DOM 85502       | L6    | 59.0 ±3.7                          | EET 87576       | H5    | 73.6 ±4.2                          |
| EET 83203       | H5    | 53.7 ±3.1                          | EET 87578       | L6    | 58.5 ±2.7                          |
| EET 87536       | L6    | 32.6 ±1.9                          | EET 87744       | L6    | 46.9 ±3.3                          |
| EET 87539       | H5    | 38.3 ±2.1                          | EET 90007       | CK4   | 59.4 ±2.8                          |
| EET 87544       | LL4   | 43.5 ±1.7                          | EET 90012       | L4    | 61.0 ±4.0                          |
| EET 87547       | H6    | 70.5 ±3.5                          | EET 90015       | CK4   | 62.3 ±2.5                          |

Uncertainties are calculated from counting statistics. All data have been corrected for background effects and counting geometry, and preliminary corrections have been made for sample geometry effects. For more information or to request a copy of the complete Battelle <sup>26</sup>Al dataset, please contact John Wacker:  
 telephone: (509) 376-1076; FAX: (509) 376-3002; e-mail: jf\_wacker@pnl.gov.



Announcing a  
**NEW**



## World Wide Web Site!

We are pleased to announce that Planetary Missions and Materials Branch personnel have developed a World Wide Web (WWW) Server for the Earth Science and Solar System Exploration Division of JSC (the server home page may be accessed with a Web browser, such as Mosaic, by opening the URL <http://www-sn.jsc.nasa.gov>). This server will provide information related to work within the division. Two nodes within the division Web Server have been developed by the Planetary Missions and Materials Branch for information relating to Planetary Missions (Exploration) and Planetary Materials (Curation).

The Planetary Missions home page is dedicated to providing information related to human exploration mission concepts beyond low Earth orbit (the exploration home page may be accessed from the URL <http://www-sn.jsc.nasa.gov/explore/explore.htm>). Available information includes space exploration news, documents, and images. An on-line reference library is available with full-text documents (both ascii and MSWord versions) of a variety of reports relating to exploration of the Moon and Mars. Fact sheets available include chronologies of missions to the Moon and Mars including mission name, country, date, mission objectives, and results. There is also a fact sheet on lunar EVAs including flight number, EVA date(s), Astronauts, activities, and time spent in EVA. Image files include computer generated images of current human mission concepts to the Moon and Mars, Apollo Images, Viking images, and a few miscellaneous images of related artwork. Most images include a short description and the NASA image number. The Apollo Experiments Catalog (NASA RP-1317) is also available for on-line reference.

The Planetary Materials home page is dedicated to providing information related to the curation of extraterrestrial materials for scientific analysis. The Curator's home page may be accessed directly by opening the URL <http://www-sn.jsc.nasa.gov/curator/curator.htm>. Available information includes facts about the purpose of curation, personal contacts, on-line access to the curatorial databases, and information on each of the four planetary sample types managed by the Curator - lunar samples, Antarctic meteorite samples, stratospheric dust particles, and space exposed surfaces. Sample information includes descriptions of the collections, instructions for requesting samples, and articles from recent newsletters. The space exposed surfaces area also includes LDEF meteoroid and debris data.

Eileen Stansbery  
Claire Dardano

## ACCESSING THE JSC SN2 CURATORIAL DATABASES

The curatorial databases may be accessed as follows:

|              |   |
|--------------|---|
| Via INTERNET | <ol style="list-style-type: none"> <li>1) Type <b>TELNET 139.169.126.35</b> or <b>TELNET CURATE.JSC.NASA.GOV.</b></li> <li>2) Type <b>PMPUBLIC</b> at the <u>USERNAME:</u> prompt.</li> </ol>   |
| Via WWW      | <ol style="list-style-type: none"> <li>1) Using a Web browser, such as Mosaic, open URL <b><a href="http://www-sn.jsc.nasa.gov/curator/curator.htm">http://www-sn.jsc.nasa.gov/curator/curator.htm</a></b>.</li> <li>2) Activate the <i>Curatorial Databases</i> link.</li> </ol>   |
| Via DECNET   | <ol style="list-style-type: none"> <li>1) Log onto your host computer.</li> <li>2) Type <b>SET HOST 9300</b> at the system prompt.</li> <li>3) Type <b>PMPUBLIC</b> at the <u>USERNAME:</u> prompt.</li> </ol> <p>NOTE: Your system manager may add node CURATE to the DECNET database on your host computer; CURATE's Decnet node number is 9.84. You may then access CURATE by typing <b>SET HOST CURATE</b> instead of <b>SET HOST 9300</b>.</p>   |
| Via modem    | <p>The modem may be between 1200 and 19200 baud; no parity; 8 data bits; and 1 stop bit. If you are calling long distance, the area code is 713.</p> <ol style="list-style-type: none"> <li>1) Dial 483-2500 for 1200-9600 bps, V.32bis/V.42bis, or 483-9498 for 1200-19200 bps, V.32bis/V.42bis.</li> <li>2) Once the connection is made, press &lt;CR&gt;. Type <b>INS</b> in response to the <u>Enter Number:</u> prompt.</li> <li>3) Press &lt;CR&gt; twice quickly until the <u>XYPLEX#&gt;</u> prompt displays.</li> <li>4) Type <b>C CURATE.JSC.NASA.GOV</b> at the <u>XYPLEX#&gt;</u> prompt.</li> <li>5) Type <b>PMPUBLIC</b> at the <u>USERNAME:</u> prompt.</li> </ol> |

For problems or additional information, you may contact:

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