Antarctic Meteorite Newsletter

Volume 42, Number 1 February 2019

Curator's Comments

Kevin Righter, NASA-JSC

New meteorites

We report the availability of 238 new meteorites, which are described here: This new batch contains samples from the 2015 ANSMET season at the Miller Range, and includes an EH3 chondrite, CK5 chondrite, and a large (13) pairing group of CV3 chondrites, as well as several ungrouped low FeO chondrites, an H impact melt breccia, L3.5, LL4, and a veined LL5 chondrite.

Loan Agreements

In the Fall of 2013, we initiated loan agreements for the Antarctic meteorite collection. Because these are 5 year agreements, many are now expiring. This is just a quick note to remind everyone that if you are still holding samples for research and your loan agreement has expired, we will need to get it renewed. Many of you will be contacted by us to get the process going.

Bibliography

Our online bibliography of peer-reviewed papers reporting data on samples from our collection, was updated in January with 54 new papers mostly from 2018. There are now >1600 papers compiled in the bibliography.

Reclassification of MIL 090292

MIL 090292 was announced as a CR1 chondrite in the August 2012 newsletter. Subsequent studies have suggested it might be a CR2 (Harju et al., 2014), and other work has highlighted the fact that it has distinct mineralogy from CR chondrites (Ni-rich metal and cubanite, while also lacking carbonate), and has O isotopic compositions offset from the trend of CR chondrites (Jilly-Rehak et al., 2018; Schrader et al., 2014). For these reasons, and because it is a small and potentially rare meteorite, we have decided to reclassify this sample as an ungrouped C1 chondrite.

Jilly-Rehak, C. E., Huss, G. R., Nagashima, K., & Schrader, D. L., 2018, Low-temperature aqueous alteration on the CR chondrite parent body: Implications from in situ oxygen-isotope analyses. Geochimica et Cosmochimica Acta, 222, 230-252, https://doi.org/10.1016/j.gca.2017.10.007

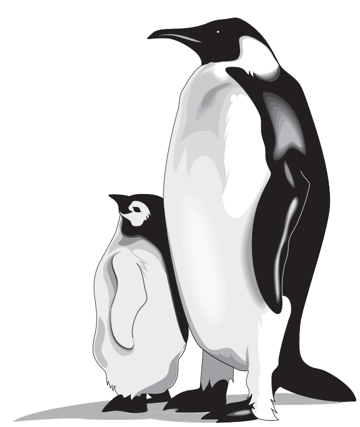
Schrader, D. L., Davidson, J., Greenwood, R. C., Franchi, I. A., Gibson, J. M., 2014, A water-ice rich minor body from the early Solar System: The CR chondrite parent asteroid. Earth and Planetary Science Letters, 407, 48-60.

Harju, E. R., Rubin, A. E., Ahn, I., Choi, B.-G., Ziegler, K., Wasson, J. T., 2014, Progressive aqueous alteration of CR carbonaceous chondrites, Geochimica et Cosmochimica Acta, 139, 15-Aug-14, 267-292, ISSN 0016-7037, http://dx.doi.org/10.1016/j.gca.2014.04.048

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 Kevin Righter, NASA Johnson Space Center, Houston, Texas 77058

Inside this Issue



Sample Request Deadline
March 8, 2019

MWG Meets
March 22-23, 2019

Report from the Smithsonian

Cari Corrigan, Geologist (Dept. of Mineral Sci.)

This newsletter reports 238 new classifications. A few changes have occurred at the Smithsonian since the last newsletter. With some collections funds that were awarded to our Collections Manager Julie Hoskin, we have been able to hire both Chris Anders and Greg Polley to work with us for the next year. They both came on board in October, and have been working hard to help us get caught up with our collections activities. With the National Museum of Natural History having been closed for all of January for the government shutdown, and the meteorites not arriving until Feb 1, the existence of this newsletter is nothing short of miraculous. I have to shout out my most sincere thanks to our crew, Tim Gooding for making thin sections, and Chris and Greg for their amazing help with a variety of newsletter related tasks. We even recruited Ph.D. student Sam Crossley from the University of Maryland who volunteered his time to help us get the newsletter finished. These guys worked hard, and without them, this would have been a MUCH smaller newsletter. Now that the newsletter is completed, we will be turning our attention toward filling your outstanding requests. While the Hyperprobe is still running beautifully, our SEM is starting to show its age and after 7 or 8 hard days of running EDS analyses for this current newsletter, the EDS detector is now off to the shop to be repaired. Luckily it held out long enough to classify over 200 OC meteorites for the newsletter! We are still eagerly awaiting the new cabinetry for our meteorite vault, which will expand our Museum vault storage capability, provide more workspace, and enable us to develop a new display case. In the meantime, we will continue to work through the tasks that allow us to supply you with your research materials!

ANSMET 2018-2019 Field Season

Ralph Harvey, Case Western Reserve University
Jim Karner, University of Utah

The 2018-19 field season to the Davis Nunataks and Mount Ward (DW) is in the books and I'd label it no less than a banner year! We recovered a whopping 865 meteorites with over a dozen achondrites included in that tally - definitely some really cool looking ones too. This year's team was led by ANMSET personnel Jim Karner, John Schutt, and Brian Rougeux, and joined by ANSMET vet Brian Hynek, along with newbies Paul Scholar, Elena Dobrica, Sheridan Ackiss and John McBrine.

Our thoughts before the start of this season were that we would be able to complete search and recovery at DW this year - there was a sizeable amount of blue ice left to be skidoo searched, but most of the moraines surrounding DW had been searched, and we thought, completed. In short, we were wrong! The season got underway as the team was put-in to DW by December 15. Search efforts began the next day but the first couple weeks were tough as severe windstorms (30 to 50 knots) kept us in the tents about half the time. The winds kept us from performing a lot of skidoo sweeps on the blue ice, so we foot-searched the heavy moraines that surround the ice fields and found a surprising amount of meteorites. The winds abated on December 30 and recovery efforts ballooned as we collected 317 meteorites in one week, mostly on sweeps on the open ice but we found 80 on a down-wind ice edge that was unexpected. Good weather continued and we recovered several dozen meteorites from newly exposed wind-rows on the far reaches of the ice fields, and perhaps the most puzzling (in a good way) event was our recovery of about 200 meteorites from a moraine we call The Beach (Figure 1-those red flags are meteorites). Puzzling because this exact same area was foot-searched four years ago and we found 200 meteorites then! Obviously there is some recharge mechanism working here that is exposing new meteorites on the surface of the moraine. The team continued search and recovery efforts until January 18, when lousy weather started up again and pull-out efforts began; the whole team was out of the field by January 24. So to sum up, we did not finish our efforts at DW but for good reason - we kept finding more meteorites! We are planning on going back next season - we anticipate finishing the area off next year, but not before recovering a lot more meteorites.

John Schutt at the Beach

Elena Dobrica, John McBrine,Paul Scholar, Jim Karner, Sheridan Ackiss, Brian Hynek, Brian Rougeux, John Schutt (left to right)

New Meteorites

2015 Collection

Pages 5-15 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 41(2), September, 2018. Specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions unless they are paired with previously described meteorites. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrological type are also recast in Table 2.

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

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

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Antarctic Meteorite Locations

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

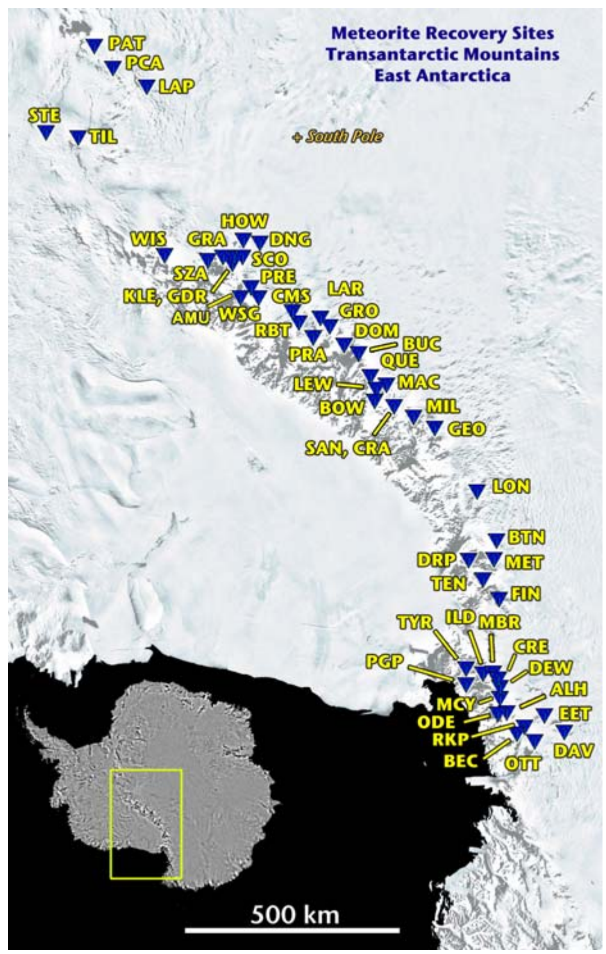

Table 1
Newly Classified Antarctic Meteorites

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15035	315.40	L6 CHONDRITE	B	A/B	24	21
MIL 15036	182.59	L6 CHONDRITE	B/C	A/B	24	22
MIL 15037	169.857	H6 CHONDRITE	B/C	B	18	17
MIL 15038	196.70	L6 CHONDRITE	Ce	A	25	22
MIL 15039	378.30	L5 CHONDRITE	B	B	24	20
MIL 15041	432.80	L6 CHONDRITE	B/C	A	25	20
MIL 15042	207.495	L5 CHONDRITE	B/C	B	24	21
MIL 15044	198.519	L5 CHONDRITE	A/B	A	25	20
MIL 15045	191.62	H6 CHONDRITE	C	A	17	16
MIL 15046	189.93	LL5 CHONDRITE	A/B	A/B	31	25
MIL 15047	399.54	H6 CHONDRITE	B/C	A	19	17
MIL 15048	484.17	L6 CHONDRITE	B/C	A	26	21
MIL 15049	142.47	H5 CHONDRITE	B/C	A	18	17
MIL 15086	41.822	L5 CHONDRITE	A/B	A	26	21
MIL 15100	2.64	H6 CHONDRITE	B/C	A	20	18
MIL 15103	7.69	H5 CHONDRITE	B/C	A/B	19	17
MIL 15109	3.60	LL5 CHONDRITE	A/B	A/B	30	25
MIL 15120	190.193	L5 CHONDRITE	B/C	B	24	21
MIL 15121	66.941	L6 CHONDRITE	B	A/B	25	21
MIL 15122	89.399	H6 CHONDRITE	B	A/B	19	17
MIL 15123	55.684	CV3 CHONDRITE	B	A/B	0-7	
MIL 15124	85.629	H6 CHONDRITE	B	A/B	20	17
MIL 15125	41.376	L6 CHONDRITE	C	A/B	24	21
MIL 15126	43.208	L5 CHONDRITE	B/C	A/B	25	21
MIL 15127	84.142	H4 CHONDRITE	B/C	A	20	
MIL 15128	67.617	L6 CHONDRITE	A/B	A	24	22
MIL 15130	15.005	L5 CHONDRITE	B/C	A/B	25	21
MIL 15131	6.764	H6 CHONDRITE	B/Ce	A	19	17
MIL 15132	15.202	H6 CHONDRITE	B/C	A	19	17
MIL 15133	17.322	L5 CHONDRITE	B/Ce	A	25	21
MIL 15134	25.503	H6 CHONDRITE	B/C	A	19	17
MIL 15135	23.956	L5 CHONDRITE	A/B	A/B	25	20
MIL 15136	17.342	L5 CHONDRITE	B/C	A	25	21
MIL 15137	15.019	H5 CHONDRITE	B/C	A	19	17
MIL 15138	7.822	H6 CHONDRITE	B/C	A	19	17
MIL 15139	8.094	L5 CHONDRITE	B/Ce	A/B	25	
MIL 15140	9.59	H5 CHONDRITE	C	A	19	17
MIL 15141	5.94	H5 CHONDRITE	C	A	19	17
MIL 15142	8.49	H5 CHONDRITE	C	A	19	17
MIL 15143	7.71	L6 CHONDRITE	C	A	25	20
MIL 15144	8.56	H6 CHONDRITE	C	A	19	17
MIL 15145	4.77	H5 CHONDRITE	C	A	19	17
MIL 15146	8.44	L6 CHONDRITE	B	A	25	21
MIL 15147	6.12	H6 CHONDRITE	B	B	19	17
MIL 15148	3.92	CV3 CHONDRITE	A/B	A	0-5	1
MIL 15149	7.39	H6 CHONDRITE	C	A	19	17
MIL 15150	1.999	H6 CHONDRITE	B/Ce	A	19	17
MIL 15151	3.345	H6 CHONDRITE	B/C	A	19	17
MIL 15152	6.618	H5 CHONDRITE	B/C	A	19	16
MIL 15154	3.02	L5 CHONDRITE	B/C	A	25	21
MIL 15155	3.758	H6 CHONDRITE	B/C	A	19	17

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15156	1.795	H6 CHONDRITE	B	A	19	17
MIL 15157	3.849	H6 CHONDRITE	B/C	A	19	17
MIL 15158	3.442	L5 CHONDRITE	B/Ce	A	25	21
MIL 15159	4.846	H5 CHONDRITE	B/C	A/B	18	17
MIL 15163	30.441	LL4 CHONDRITE	B	A	28	23
MIL 15170	3.773	H5 CHONDRITE	B/C	A/B	18	16
MIL 15171	2.949	LL5 CHONDRITE	B	A/B	30	22
MIL 15172	7.076	H6 CHONDRITE	B/C	A/B	18	16
MIL 15173	5.233	L5 CHONDRITE	B	A/B	25	20
MIL 15174	1.799	L5 CHONDRITE	B	A	25	20
MIL 15175	4.70	L5 CHONDRITE	B/C	A	25	21
MIL 15176	5.30	LL4 CHONDRITE	Be	A	28	23
MIL 15177	3.807	H6 CHONDRITE	B/C	A	18	16
MIL 15178	5.941	H6 CHONDRITE	B	A	19	17
MIL 15179	3.011	H5 CHONDRITE	Be	A/B	20	17
MIL 15182	7.897	H5 CHONDRITE	B/C	A	18	16
MIL 15183	6.239	L6 CHONDRITE	A/B	A	26	22
MIL 15184	3.646	H5 CHONDRITE	B/c	A	19	17
MIL 15185	2.568	L6 CHONDRITE	B/C	A/B	25	21
MIL 15186	3.799	LL6 CHONDRITE	B	A	29	
MIL 15187	1.622	LL6 CHONDRITE	B/C	A	28	24
MIL 15190	18.849	H6 CHONDRITE	B/C	A/B	19	17
MIL 15191	3.994	H5 CHONDRITE	B/C	A	19	17
MIL 15192	12.391	CV3 CHONDRITE	B	A	1-11	1
MIL 15193	1.903	H5 CHONDRITE	B/C	A	19	17
MIL 15194	3.789	LL6 CHONDRITE	A/B	A	29	22
MIL 15195	2.973	H6 CHONDRITE	B/C	A	19	17
MIL 15197	4.845	H5 CHONDRITE	B/C	A	20	17
MIL 15198	1.889	L6 CHONDRITE	B/Ce	B	25	21
MIL 15199	4.508	L6 CHONDRITE	B/C	A/B	23	19
MIL 15200	5.43	H5 CHONDRITE	B/C	A	18	17
MIL 15201	6.468	L6 CHONDRITE	B/C	A/B	25	20
MIL 15202	3.367	L5 CHONDRITE	A/Be	A/B	24	20
MIL 15203	8.351	H6 CHONDRITE	B/C	A/B	20	18
MIL 15204	3.493	H5 CHONDRITE	B/Ce	A	18	17
MIL 15205	6.605	H5 CHONDRITE	B/C	A/B	19	17
MIL 15206	7.451	H6 CHONDRITE	B/C	A	20	18
MIL 15207	10.825	L6 CHONDRITE	A/B	A/B	25	21
MIL 15208	9.394	H6 CHONDRITE	B/C	A/B	19	18
MIL 15209	5.764	L6 CHONDRITE	A/B	A/B	25	21
MIL 15210	12.84	L6 CHONDRITE	B/C	A/B	25	22
MIL 15211	29.25	L5 CHONDRITE	B/C	A	25	20
MIL 15212	21.81	L6 CHONDRITE	B/C	A	25	21
MIL 15214	12.59	H5 CHONDRITE	B/C	A/B	18	16
MIL 15215	22.25	H6 CHONDRITE	C	A	19	17
MIL 15216	27.10	H6 CHONDRITE	A/B	A/B	19	17
MIL 15217	9.36	L5 CHONDRITE	A/B	A/B	25	20
MIL 15218	26.59	H6 CHONDRITE	C	A/B	19	17
MIL 15219	21.77	H6 CHONDRITE	C	A/B	19	17
MIL 15220	4.389	L6 CHONDRITE	B/C	A	25	19
MIL 15221	3.978	L6 CHONDRITE	B	A	25	21
MIL 15223	2.84	H4 CHONDRITE	B/C	B	18	16
MIL 15224	4.018	H6 CHONDRITE	B/C	A/B	20	18
MIL 15226	1.741	H5 CHONDRITE	B	A	21	17

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15227	2.511	CV3 CHONDRITE	B	A	1-14	1
MIL 15229	2.888	CV3 CHONDRITE	B	A	0-11	1
MIL 15240	5.41	CV3 CHONDRITE	A/B	A	1-8	0-1
MIL 15241	9.02	L5 CHONDRITE	B/C	A	25	20
MIL 15247	7.41	CV3 CHONDRITE	A/B	A	1-13	2
MIL 15260	7.854	H6 CHONDRITE	C	A	20	16
MIL 15261	10.068	L6 CHONDRITE	B/C	A	25	21
MIL 15262	8.718	H5 CHONDRITE	B/C	A	19	17
MIL 15263	7.371	L6 CHONDRITE	B/C	A	23	18
MIL 15264	4.542	CV3 CHONDRITE	A/B	A	1-9	1-3
MIL 15265	5.60	CV3 CHONDRITE	A	A	0-6	1
MIL 15266	4.329	H6 CHONDRITE	C	A	20	18
MIL 15267	3.019	H6 CHONDRITE	B	A	18	17
MIL 15268	4.018	CV3 CHONDRITE	B/C	A	0-9	1
MIL 15269	6.21	H6 CHONDRITE	B/C	A	20	18
MIL 15270	3.41	H6 CHONDRITE	B/C	A/B	20	18
MIL 15271	4.188	H6 CHONDRITE	B/C	A	20	
MIL 15273	2.541	L5 CHONDRITE	B	A/B	25	21
MIL 15274	2.555	H CHONDRITE(IMPACT MELT)	B/C	A/B	19	17
MIL 15275	7.614	H6 CHONDRITE	B	A	20	18
MIL 15276	8.831	L6 CHONDRITE	B/C	A/B	26	
MIL 15278	1.82	H5 CHONDRITE	B/C	A	20	18
MIL 15279	3.359	H6 CHONDRITE	B	A	20	18
MIL 15282	14.71	H5 CHONDRITE	B	A/B	19	18
MIL 15283	40.40	H6 CHONDRITE	B	A/B	20	18
MIL 15284	16.08	H6 CHONDRITE	B	A/B	20	17
MIL 15285	39.65	LL4 CHONDRITE	A/B	A	28	23
MIL 15286	34.65	H6 CHONDRITE	B/C	A		17
MIL 15287	20.85	L6 CHONDRITE	A/B	A/B	25	22
MIL 15288	40.57	H5 CHONDRITE	B/C	A/B	20	
MIL 15289	21.13	H6 CHONDRITE	C	A	19	17
MIL 15290	1.998	L6 CHONDRITE	B/C	A/B	25	21
MIL 15293	3.809	CHONDRITE UNGROUPED	B/C	A	14	12
MIL 15295	6.30	H5 CHONDRITE	B	A	20	17
MIL 15296	2.406	H5 CHONDRITE	B	A	21	18
MIL 15297	6.404	L6 CHONDRITE	B/C	A	25	20
MIL 15298	1.918	H5 CHONDRITE	B/C	A	19	17
MIL 15307	37.596	CK5 CHONDRITE	A/B	A/B	33	
MIL 15310	222.42	LL5 CHONDRITE	B	A/B	28	24
MIL 15311	130.41	LL6 CHONDRITE	B	A/B	28	23
MIL 15312	108.11	H6 CHONDRITE	B	A/B	19	17
MIL 15313	114.51	L6 CHONDRITE	B	A		21
MIL 15314	85.05	LL5 CHONDRITE	A/B	B	29	24
MIL 15315	86.88	L5 CHONDRITE	B	A	25	21
MIL 15316	49.15	H5 CHONDRITE	C	A/B	19	17
MIL 15317	45.81	H6 CHONDRITE	C	A	20	18
MIL 15318	56.83	H6 CHONDRITE	C	A	20	18
MIL 15319	68.87	H5 CHONDRITE	C	A	19	17
MIL 15320	50.387	H6 CHONDRITE	B/C	A/B	20	18
MIL 15321	27.94	L6 CHONDRITE	B	A	25	22
MIL 15322	29.274	EH3 CHONDRITE	B/C	A/B	0-1	0-2

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15323	26.391	L5 CHONDRITE	B/C	A/B	25	20
MIL 15324	40.274	L6 CHONDRITE	A/B	A/B	25	22
MIL 15325	13.603	H5 CHONDRITE	B/C	A/B	18	16
MIL 15326	11.842	H6 CHONDRITE	B/C	A/B	19	17
MIL 15327	33.202	L6 CHONDRITE	A/B	A/B	25	21
MIL 15330	11.14	LL6 CHONDRITE	B	A/B	29	23
MIL 15331	7.71	H5 CHONDRITE	B/C	B	19	17
MIL 15332	6.68	L5 CHONDRITE	B/C	A	25	20
MIL 15333	4.09	L6 CHONDRITE	B/C	A	25	21
MIL 15334	4.50	H4 CHONDRITE	B/C	A	20	19
MIL 15335	11.50	H6 CHONDRITE	B	A/B	21	17
MIL 15336	8.96	L5 CHONDRITE	B	A/B	25	21
MIL 15337	10.57	L5 CHONDRITE	A/B	A/B	24	20
MIL 15338	15.97	H6 CHONDRITE	B/C	A	20	18
MIL 15339	16.84	H5 CHONDRITE	B/C	A	20	18
MIL 15341	13.893	LL6 CHONDRITE	B/C	A	30	25
MIL 15342	14.857	H6 CHONDRITE	B/C	A/B	19	17
MIL 15343	35.975	H5 CHONDRITE	B/C	A	19	17
MIL 15344	22.145	L4 CHONDRITE	B/C	A	26	18-23
MIL 15345	21.513	H5 CHONDRITE	B/C	A	19	15
MIL 15346	16.402	H5 CHONDRITE	B/C	A/B	22	18
MIL 15348	7.82	H6 CHONDRITE	B/C	A/B	19	17
MIL 15349	4.159	H6 CHONDRITE	B/C	A	19	17
MIL 15360	54.022	H6 CHONDRITE	B/C	A/B	20	17
MIL 15361	63.069	H6 CHONDRITE	A/B	B	19	17
MIL 15362	42.625	CHONDRITE UNGROUPED	B/C	A	16	9-26
MIL 15363	21.517	CV3 CHONDRITE	B/C	A	1-8	1
MIL 15364	17.901	LL5 CHONDRITE	B/C	A/B	28	23
MIL 15365	31.393	H6 CHONDRITE	B/Ce	A	20	18
MIL 15366	40.989	H4 CHONDRITE	B	A	19	17
MIL 15367	45.761	H6 CHONDRITE	B	B	20	17
MIL 15368	66.405	H5 CHONDRITE	B/C	A	20	17
MIL 15369	40.077	H5 CHONDRITE	B/Ce	A		17
MIL 15385	89.47	H5 CHONDRITE	B	A/B	19	17
MIL 15386	54.65	L6 CHONDRITE	B	A/B	22	20
MIL 15387	104.64	H5 CHONDRITE	B/C	B	21	17
MIL 15388	84.72	L6 CHONDRITE	B/C	A	25	20
MIL 15389	62.60	H6 CHONDRITE	B/C	A	21	16
MIL 15440	6.133	L6 CHONDRITE	B/C	A	25	21
MIL 15441	3.854	H6 CHONDRITE	B/C	A	20	17
MIL 15442	3.11	L6 CHONDRITE	B/C	A	24	20
MIL 15443	1.729	L6 CHONDRITE	B/C	A	25	21
MIL 15444	2.652	L5 CHONDRITE	B/C	A	25	21
MIL 15445	1.538	H6 CHONDRITE	B/C	A	19	17
MIL 15446	3.997	L5 CHONDRITE	B/C	A	25	21
MIL 15447	5.416	H5 CHONDRITE	B/C	A	20	18
MIL 15500	11.464	L6 CHONDRITE	C	A	25	21
MIL 15501	9.473	H5 CHONDRITE	C	A/B	20	18
MIL 15502	7.557	H6 CHONDRITE	C	A/B	19	17

Sample Number	Weight (g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15503	14.407	H5 CHONDRITE	C	A	19	17
MIL 15504	15.435	H6 CHONDRITE	C	A	20	17
MIL 15505	8.789	H6 CHONDRITE	C	A/B	20	17
MIL 15506	12.055	L6 CHONDRITE	B/C	A/B	24	21
MIL 15507	10.712	H6 CHONDRITE	C	A	18	
MIL 15508	8.292	H6 CHONDRITE	B/C	A/B	20	18
MIL 15509	16.108	H6 CHONDRITE	C	A	19	17
MIL 15511	10.30	CV3 CHONDRITE	A/B	A	1-5	
MIL 15515	5.29	L3.5 CHONDRITE	B	A	5-37	1-18
MIL 15516	3.29	CV3 CHONDRITE	A	B	0-5	1
MIL 15519	3.58	LL5 CHONDRITE	A/B	A/B	30	24
MIL 15520	6.784	H6 CHONDRITE	B/C	A		18
MIL 15521	5.64	H5 CHONDRITE	B/C	A	19	17
MIL 15522	2.498	H6 CHONDRITE	B/C	A	19	17
MIL 15523	6.635	H4 CHONDRITE	B	A	20	14
MIL 15525	6.751	H6 CHONDRITE	B/C	A	18	16
MIL 15526	2.839	LL5 CHONDRITE	B	A	29	21
MIL 15527	2.837	L6 CHONDRITE	A/B	A	24	20
MIL 15529	5.131	H5 CHONDRITE	B/C	A	19	17
MIL 15539	0.740	H5 CHONDRITE	C	C	18	15
MIL 15541	3.55	H5 CHONDRITE	B/C	A	20	18
MIL 15542	4.94	H6 CHONDRITE	B/C	A	20	18
MIL 15543	3.60	LL4 CHONDRITE	C	A	28	22
MIL 15544	5.41	H5 CHONDRITE	C	A	20	
MIL 15545	6.21	LL6 CHONDRITE	C	A	27	22
MIL 15546	3.02	L6 CHONDRITE	B	A/B	25	20
MIL 15547	5.63	H6 CHONDRITE	C	A	19	17
MIL 15549	6.95	H6 CHONDRITE	C	A	19	17
MIL 15560	3.59	H6 CHONDRITE	C	A	20	18
MIL 15561	4.71	L5 CHONDRITE	C	A	25	21
MIL 15563	3.63	H6 CHONDRITE	C	A	18	17
MIL 15564	2.44	H6 CHONDRITE	B/C	A	19	18
MIL 15566	2.06	H6 CHONDRITE	C	A	20	18

Table 2
Newly Classified Meteorites Listed by Type

Carbonaceous Chondrites

Sample Number	Weight(g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15307	37.596	CK5 CHONDRITE	A/B	A/B	33	
MIL 15123	55.684	CV3 CHONDRITE	B	A/B	0-7	
MIL 15148	3.92	CV3 CHONDRITE	A/B	A	0-5	1
MIL 15192	12.391	CV3 CHONDRITE	B	A	1-11	1
MIL 15227	2.511	CV3 CHONDRITE	B	A	1-14	1
MIL 15229	2.888	CV3 CHONDRITE	B	A	0-11	1
MIL 15240	5.41	CV3 CHONDRITE	A/B	A	1-8	0-1
MIL 15247	7.41	CV3 CHONDRITE	A/B	A	1-13	2
MIL 15264	4.542	CV3 CHONDRITE	A/B	A	1-9	1-3
MIL 15265	5.60	CV3 CHONDRITE	A	A	0-6	1
MIL 15268	4.018	CV3 CHONDRITE	B/C	A	0-9	1
MIL 15363	21.517	CV3 CHONDRITE	B/C	A	1-8	1
MIL 15511	10.30	CV3 CHONDRITE	A/B	A	1-5	
MIL 15516	3.29	CV3 CHONDRITE	A	B	0-5	1

Chondrites

Sample Number	Weight(g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15293	3.809	CHONDRITE UNGROUPED	B/C	A	14	12
MIL 15362	42.625	CHONDRITE UNGROUPED	B/C	A	16	9-26

E Chondrite

Sample Number	Weight(g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15322	29.274	EH3 CHONDRITE	B/C	A/B	0-1	0-2

H Chondrite

Sample Number	Weight(g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15274	2.555	H CHONDRITE (IMPACT MELT)	B/C	A/B	19	17

L Chondrite

Sample Number	Weight(g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15515	5.29	L3.5 CHONDRITE	B	A	5-37	1-18

LL Chondrite

Sample Number	Weight(g)	Classification	Weathering	Fracturing	%Fa	%Fs
MIL 15285	39.65	LL4	A/B	A	28	23
MIL 15046	189.93	LL5	A/B	A/B	31	25

**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.

Classification of the ordinary chondrites in Table 1 & 2 was done by Energy Dispersive Spectroscopic (EDS) methods using a Scanning Electron Microscope (SEM). This can include the analysis of several olivine and pyroxene grains to determine the approximate Fayalite and Ferrosilite values of the silicates, grouping them into H, L or LL chondrites. Petrologic types are determined by optical microscopy and are assigned based on the distinctiveness of chondrule boundaries on broken surfaces of a 1-3 g chip. While this technique is suitable for general characterization and delineation of equilibrated ordinary chondrites, those undertaking detailed study of any meteorite classified by optical methods alone should use caution. It is recommended that a polished thin section be requested to accompany any chip and appropriate steps for a more detailed characterization should be undertaken by the user. (Cari Corrigan, Smithsonian Institution)

Table 3

Tentative Pairings for New Meteorites

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U.S. Antarctic collection should refer to the compilation provided by Dr. E.R. D. Scott, as published in the Antarctic Meteorite Newsletter vol. 9 (no. 2) (June 1986). Possible pairings were updated in Meteoritical Bulletins 76, 79, 82 through 106, which are available online from the Meteoritical Society webpage:

http://www.lpi.usra.edu/meteor/metbull.php

CV3 CHONDRITE

MIL 15148, MIL 15192, MIL 15227, MIL 15229, MIL 15240, MIL 15247, MIL 15264, MIL 15265, MIL 15268, MIL 15363, MIL 15511, and MIL 15516 with MIL 15123

Petrographic Descriptions

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15046	Miller Range	23033	5.5 x 5.1 x 3.9	189.930	LL5 Chondrite

Macroscopic Description: Kellye Pando
The exterior of this meteorite is covered with patches of dark grey-black fusion crust mixed with patches of lighter grey weathering and a few orange rust spots. The fresh interior is a very dark brown matrix mixed with areas of black matrix and a few orange rust spots.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy
This meteorite is an LL chondrite with extensive shock veining. These veins include minute particles of metal and sulfide. Shock blackening of the clasts is prevalent. A brief optical examination revealed no high-pressure polymorphs. Olivines are Fa_{31} and pyroxenes are Fs_{25}.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15123	Miller Range	23385	4.5 x 3.8 x 2.1	55.684	CV3 Chondrite
MIL 15148		23348	2.0 x 1.2 x 0.9	3.920	
MIL 15192		23324	2.8 x 1.8 x 1.3	12.391	
MIL 15227		23346	1.5 x 1.5 x 0.5	2.511	
MIL 15229		23376	1.9 x 1.6 x 0.6	2.888	
MIL 15240		23366	1.6 x 1.7 x 1.1	5.410	
MIL 15247		23338	3.0 x 2.1 x 1.0	7.410	
MIL 15264		23336	1.8 x 1.7 x 0.9	4.542	
MIL 15265		23351	1.7 x 1.5 x 1.7	5.600	
MIL 15268		23333	2.0 x 1.4 x 1.0	4.018	
MIL 15363		23651	2.7 x 2.5 x 1.7	21.517	
MIL 15511		23644	1.9 x 2.5 x 1.0	10.300	
MIL 15516		23677	2.1 x 1.4 x 0.8	3.290	

Macroscopic Description: Kellye Pando, Cecilia Satterwhite
Exteriors of these carbonaceous chondrites range from 5-98% black/brown fusion crust; some surfaces are shiny with orange rust spots. Exposed surfaces are black to dark reddish brown with oxidation. The interiors range from grey to black matrix with minor rust spots and some have light inclusions.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy
These sections are similar enough that a single description is given, although a more detailed description is warranted. These sections exhibit large chondrules (up to 3 mm) with refractory inclusions and amoeboid olivine aggregates in a dark matrix. Metal and sulfide are common in these meteorites, including a ~3 mm irregularly shaped particle in MIL 15148. Olivines range from Fa_{1-31}, with most Fa_{1-5}, and pyroxenes from Fs_{1-3}. The meteorites are unequilibrated and appear to be carbonaceous chondrites, probably reduced CV3s.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15274	Miller Range	24111	2.0 x 1.4 x 0.9	2.555	H Chondrite (Impact Melt)

Macroscopic Description: Cecilia Satterwhite
The exterior of this meteorite has 30% black/brown fusion crust, areas without fusion crust are weathered brown. The interior is a brown matrix with weathered inclusions/chondrules; metal and some patches of weathered gray matrix are visible.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy
This meteorite is an H chondrite impact melt with an exceptionally fine-grained silicate matrix, which contains a small number of silicate clasts and metal-sulfide particles typically 100 microns or less in size. Olivines are Fa_{19} and pyroxenes are Fs_{17}.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15285	Miller Range	24080	3.6 x 3.1 x 2.2	39.65	LL4 Chondrite

Macroscopic Description: Kellye Pando

90% of the exterior is covered with a rough, black fusion crust that has some pitting. The exposed interior is a grey matrix with both light and dark, round inclusions (1-2 mm) and some dark orange rust spots.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy

The host of the meteorite is an unremarkable LL4 chondrite that is modestly weathered and shocked. Olivine compositions are Fa_{28}, pyroxene compositions are Fs_{23}. However, this meteorite contains a remarkable set of inclusions including a 3.5 x 2.4 mm single grain of plagioclase that exhibits numerous fractures and mosaicism. The composition is $An_{67}Or_1$. In addition, there is a ~3 mm diameter olivine-rich chondrule (?) with slightly heterogeneous compositions of Fa_{25-29} and a 2 mm diameter silicate glass particle with cruciform dendritic quench crystals. The variety of particles suggest that this rock may be an asteroidal regolith breccia.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15293	Miller Range	24083	1.9 x 1.4 x 1.0	3.809	Chondrite Ungrouped

Macroscopic Description: Cecilia Satterwhite

The majority of the exterior is weathered brown with patches of black/brown fusion crust. The interior is brown with heavy oxidation and some darker matrix, metal is visible.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy

The section exhibits a few poorly defined chondrules (up to 1.5 mm) in a black, shock-darkened matrix of fine-grained silicates, and coarse metal and troilite. Metal and sulfide exhibit fizz texture. The meteorite is moderately weathered. Olivine is Fa_{14}, pyroxene is Fs_{12}. The meteorite is a low FeO chondrite of type 5 (Russell et al. MAPS 1998). The meteorite is similar in mineral compositions to Willaroy and Suwahib (Buwah).

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15307	Miller Range	24030	3.75 x 3.5 x 3.25	37.596	CK5 Chondrite

Macroscopic Description: Kellye Pando

The exterior has dark grey to black fusion crust (100%) with light greenish grey weathering and a few rust colored dots of weathering. Interior is a dark grey matrix with some grey to black inclusions and a few orange weathered spots.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy

The section consists of large (up to 1.5 mm), well-defined chondrules in a matrix of finer-grained silicates, sulfides and abundant magnetite grains. The meteorite is slightly weathered, but extensively shock blackened. Silicates are homogeneous. Olivine is Fa_{33}. The meteorite is a CK5 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15322	Miller Range	23058	3.9 x 3.0 x 2.0	29.274	EH3 Chondrite

Macroscopic Description: Cecilia Satterwhite

70% black fusion crust covers the exterior, some surfaces are fractured and frothy. The rest of the exterior is rusty brown. The interior is a dark gray to black matrix with metal, some oxidation which is heavy in areas.

Thin Section (,2) Description: Cari Corrigan, Tim McCoy

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.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15362	Miller Range	23621	4.6 x 2.8 x 1.9	42.625	Chondrite Ungrouped

<u>Macroscopic Description: Cecilia Satterwhite</u>
The exterior has 60% black/brown fusion crust with oxidation haloes, and rust. Exposed surfaces are brown with inclusions/chondrules visible. The interior is weathered brown with metal and some rusty/weathered inclusions/chondrules.

<u>Thin Section (,2) Description: Cari Corrigan, Tim McCoy</u>
The section exhibits numerous small, well-defined chondrules up to 1.5 mm in a black matrix of fine grained silicates, metal and troilite. Polysynthetically twinned pyroxene is abundant. The meteorite is moderately weathered. Olivine is Fa_{16}, pyroxene is Fs_{9-26}. The meteorite is a low FeO chondrite of type 4 (Russell et al. MAPS 1998). The meteorite is similar in mineral compositions to Willaroy and Suwahib (Buwah).

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
MIL 15515	Miller Range	23694	2.1 x 1.3 x 1.5	5.290	L3.5 Chondrite

<u>Macroscopic Description: Kellye Pando</u>
65% of the exterior is covered with a very dark brown-black fusion crust. The exposed surface is dark brown with numerous rounded inclusions (0.5-4 mm) that are light grey and light brown. There is also some orange rust present. Fresh interior is a black matrix with light grey, light brown and dark brown round inclusions (up to 2 mm) and orange rust throughout.

<u>Thin Section (,2) Description: Cari Corrigan, Tim McCoy</u>
The section exhibits numerous small, well-defined chondrules (up to 2 mm) in a black matrix of fine-grained silicates, metal and troilite. Weak shock effects are present. Polysynthetically twinned pyroxene is common. The meteorite is moderately weathered. Silicates are unequilibrated; olivines range from Fa_{5-37}, and pyroxenes from Fs_{1-18}. The meteorite is an L3 chondrite (estimated subtype 3.5).

Sample Request Guidelines

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

Requests that are received by the MWG secretary by March 8, 2019 deadline will be reviewed at the MWG meeting on Mar. 22-23, 2019 in Houston, TX. Requests that are received after the deadline may be delayed for review until MWG meets again in the Fall of 2019. Please submit your requests on time. Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, or phone.

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

Samples can be requested from any meteorite that has been made available through announcement in any issue of the ***Antarctic Meteorite Newsletter*** (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in five *Smithsonian Contributions to the Earth Sciences*: Nos. 23, 24, 26, 28, and 30. Tables containing all classified meteorites as of August 2006 have been published in the Meteoritical Bulletins and *Meteoritics* and *Meteoritics and Planetary Science.*

They are also available online at:

https://meteoritical.org/publications/the-meteoritical-bulletin

The most current listing is found online at:

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

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

http://curator.jsc.nasa.gov/antmet/requests.cfm

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

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

JSC-ARES-MeteoriteRequest@nasa.gov

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

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

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

Antarctic Meteorite Laboratory Contact Numbers

Please submit request to: **JSC-ARES-MeteoriteRequest@nasa.gov**

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Meteorites On-Line

Several meteorite web sites 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://curator.jsc.nasa.gov/antmet/
JSC Curator, HED Compendium	http://curator.jsc.nasa.gov/antmet/hed/
JSC Curator, Lunar Meteorite Compendium	http://curator.jsc.nasa.gov/antmet/lmc/
JSC Curator, Mars Meteorite Compendium	http://curator.jsc.nasa.gov/antmet/mmc/
ANSMET	http://caslabs.case.edu/ansmet/
Smithsonian Institution	http://mineralsciences.si.edu/
Lunar Planetary Institute	http://www.lpi.usra.edu
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
Meteoritical Bulletin online Database	http://www.lpi.usra.edu/meteor/metbull.php
Museo Nazionale dell'Antartide	http://www.mna.it/collezioni/catalogo-meteoriti-sede-di-siena
BMNH general meteorites	http://www.nhm.ac.uk/our-science/collections/mineralogy-collections/meteorites-collection.html
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1945-5100
Meteorite Times Magazine	https://www.meteorite-times.com/
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://meteorites.wustl.edu/lunar/moon_meteorites.htm
Washington Univ. "meteor-wrong"	http://meteorites.wustl.edu/meteorwrongs/meteorwrongs.htm
Portland State Univ. Meteorite Lab	http://meteorites.pdx.edu/
Northern Arizona University	http://www4.nau.edu/meteorite/
Martian Meteorites	http://www.imca.cc/mars/martian-meteorites.htm

Other Websites of Interest

OSIRIS-REx	http://osiris-rex.lpl.arizona.edu/
Mars Exploration	http://mars.jpl.nasa.gov
Rovers	http://marsrovers.jpl.nasa.gov/home/
Near Earth Asteroid Rendezvous	http://near.jhuapl.edu/
Stardust Mission	http://stardust.jpl.nasa.gov
Genesis Mission	http://genesismission.jpl.nasa.gov
ARES	http://ares.jsc.nasa.gov/
Astromaterials Curation	http://curator.jsc.nasa.gov/