Antarctic Meteorite Newsletter
Volume 37, Number 1 February 2014

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

Curator's Comments

Kevin Righter, NASA-JSC

This newsletter reports 545 new meteorites from the 2010 ANSMET season from the Dominion Range (DOM10) and La Paz Ice Field (LAP10) areas. Samples announced in this newsletter will be of great interest to those studying chondrites, because they include detailed descriptions for seven new carbonaceous chondrites (2 CO, 4 CR and 1 CV), an enstatite chondrite (EL6), and four impact melt breccias (2 L, one LL, and one H). The 2010 season samples have been fully characterized at JSC, and the remaining samples from this season will be announced in the Fall 2014 newsletter.

Reminder about new rules for PIs: loan agreements and annual inventories

This past summer we started two new policies regarding the loans of Antarctic meteorites from the US collection at NASA-JSC. All scientists will have to: a) complete an annual inventory, and b) complete a valid loan agreement if you are currently holding or wishing to request samples from our collection. Many of you have followed through on these two new policies and we appreciate your efforts to do so. For those of you who have not, we would like to receive your annual inventories and loan agreements (if still holding samples) as soon as possible. We will send out reminders to those who have not completed either or both of these requirements.

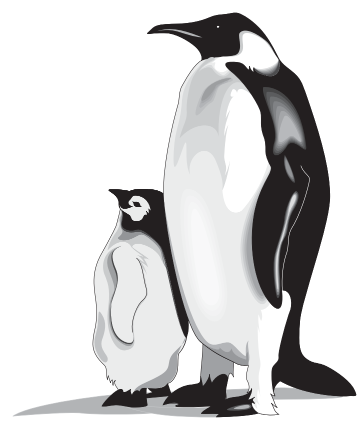
These two new policies are explained in detail in our new Antarctic Meteorite Sample Investigators Guidebook, available online:

http://curator.jsc.nasa.gov/antmet/forms/

If you are downloading forms from our webpage, there is an instruction page at the beginning of the loan agreement form. Please do not try to enter data into the instruction page (with yellow highlights) – you must enter information in the grey boxes on the pages following the instructions, as described in the instructions. This is the most common difficulty people are having with the forms, so please follow the instructions and don't just skip them.

If you have any questions please contact Dr. Kevin Righter (kevin.righter-1@nasa.gov) or Cecilia Satterwhite (cecilia.e.satterwhite@nasa.gov).

Inside this Issue



Sample Request Deadline
March 7, 2014

MWG Meets
March 22-23,2014

A synopsis of the 2013-2014 ANSMET season; looking for the bright side - *Ralph Harvey*

Both ANSMET (the US Antarctic Search for Meteorites program) and the US Antarctic Program (USAP) faced some of their biggest challenges in decades during the just-completed 2013-2014 field season. In the end both ANSMET and USAP managed to get some great science done, but compromises and logistical shortages had their impacts.

Two longer-term challenges became obvious about a year ago. The "Sequester", the mandated reduction in US government spending (and worth noting, purposefully designed by Congress to hurt) caused some serious aches and pains within USAP and the National Science Foundation's Office of Polar Programs, both mandated to support US activities in Antarctica. The result was planned cutbacks in terms of aerial support, a key lifeline for the program. Warming was the second challenge; but instead of the broad climate change you might first think of, it was more of a local issue. For most of the past 15 years a giant iceberg has been blocking northward iceflow in the southernmost reaches of the Ross Sea, and as a result the McMurdo Sound area retained significantly more sea-ice than usual. This in turn provided relatively cold local conditions and allowed USAP to use their Pegasus airfield (an ice-based compacted-snow runway suitable for very large wheeled aircraft) throughout the austral summer. But the big iceberg went away three summers ago, and the relative warming that resulted meant that the Pegasus runway has returned to a "normal" condition, too soft at the height of summer. Together these longer-term issues meant a reduced availability of ski-equipped cargo planes AND no ability to augment them with wheeled aircraft throughout the height of summer, putting serious strain on USAP's aerial transport capabilities from both the science support and station support directions. With these issues in mind, USAP carefully reduced the overall number and support level of science projects, and it all seemed doable if somewhat spartan.

The reunited 2013-2014 ANSMET field team, finding meteorites. From left to right: Jani Radebaugh, Alex Meshik, John Schutt, Jim Karner, Steve Ballou, Barbara Cohen, Morgan Martinez, Manavi Jadhav.

Typically the Antarctic field season ramps up in late August and early September, with people and cargo start flying down *en masse* in a surge called "Winfly". Because of the sequester, 2013's surge was purposefully delayed and reduced in intensity, essentially spread throughout late September. Then the "Shutdown" hit on October 1, at the worst possible time for Antarctic operations. Hitting when it did, the Shutdown meant that almost overnight USAP had to reverse course 180 degrees, not only stopping preparations for a summer of science and exploration but turning it into a race against time, preparing McMurdo and South Pole to survive a full year without resupply. Of course the shutdown ended a few weeks later, but it had to be taken very seriously with hundreds of lives and millions of dollars at great risk, and the damage to the 2013-201 season was severe. What was to be a modest season with reduced goals became triage; scramble to rescue at least a few scientific programs rather than shut down US Antarctic science entirely for the first time in 6 decades.

At first it looked like all of this would have a relatively modest effect on ANSMET. We don't routinely enter into USAP's plans for October; we usually get to McMurdo in late November and into the field in early December, given our fieldwork demands the best possible weather at the height of the austral summer. This was also our first season as a project wholly funded by NASA, and all the agencies involved really wanted to make this new funding paradigm work. Last spring we worked with USAP and its contractors to reduce our logistical needs, and then we did it again in late October. The resulting plan was appropriately frugal, with one less field party member, a reduced schedule of mid-season flights, and a season shortened by nearly a half.

As our expected late November departure approached, it became clear that meeting even these modest plans would be a challenge. We're very used to dealing with this kind of uncertainty, and because our work doesn't depend on hitting any specific targets on specific days (we have very flexible launch windows), we've learned to be patient. Timetables shifted, and when the dust settled half of our team made it to our target (the venerable Miller Range) right on time, with the remaining team and gear to follow the next day.

And then it became the next day, and then the next, and then the next week, and in the end it became next month. The shortage of air crews, mechanical problems in a limited fleet and the increasing demand on ski-equipped airplanes to supply both McMurdo and South Pole, when mixed in with weather and landing strip conditions, left four members of our team and several critical pieces of gear in McMurdo, while the other four team members sat at Miller Range. With only three snowmobiles and limited fuel, the latter managed to do some searching, but with only minimal collection gear they simply had to flag the meteorites and wait. And waiting was pretty much all the folks in McMurdo could do. It wasn't until early January, just after New Year's Day, that the team was reunited. USAP graciously let us add time back into our shortened season, giving us at least a couple of weeks of searching by the full team.

In the end, the team made the most of their shortened season, recovering over 300 samples, including many VERY interesting specimens (you'll have to wait a few months to hear about those). We've been asked several times if it was worth it, and personally I think it was; if you're not willing to face risks like the weather, tough schedules and general uncertainty, you're not going to recover meteorites. I won't lie to you; personally I'm glad I chose this year to stay home. But I'm much happier that the ANSMET team persevered, found a way to successfully recover meteorites, and if even a few of those interesting specimens are what we think they are, I think you'll be very happy too.

AND NEWS JUST IN. The tribulations continue. We learned just a few days ago that in the last days of January a storm did severe damage to McMurdo Station's ice dock, preventing a significant amount of cargo from being loaded onto the annual cargo ship. Among the cargo that now cannot sail home were multiple freezer vans, including the one containing the 2014 ANSMET meteorites. Federal regulations demand we keep the meteorites frozen; and after exploring many options, it became clear the best way to protect the samples was to leave them in McMurdo until the next northbound cargo ship (due in early 2015). The bright side? I guess now we can expect twice the normal number of extraordinary specimens reported in 2015 fall newsletter..... sigh.

New Meteorites

2010 Collection

Pages 5-20 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 36(2), Sept. 2013. Specimens of special petrologic type (carbonaceous chondrite, unequilibrated ordinary chondrite, achondrite, etc.) are represented by separate descriptions unless they are paired with previously described meteorites. However, some specimens of non-special petrologic type are listed only as single line entries in Table 1. For convenience, new specimens of special petrological type are also recast in Table 2.

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

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

Kathleen McBride, Charis Krysher, Jeremy Kent, Roger Harrington and Cecilia Satterwhite
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Antarctic Meteorite Locations

ALH — Allan Hills
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

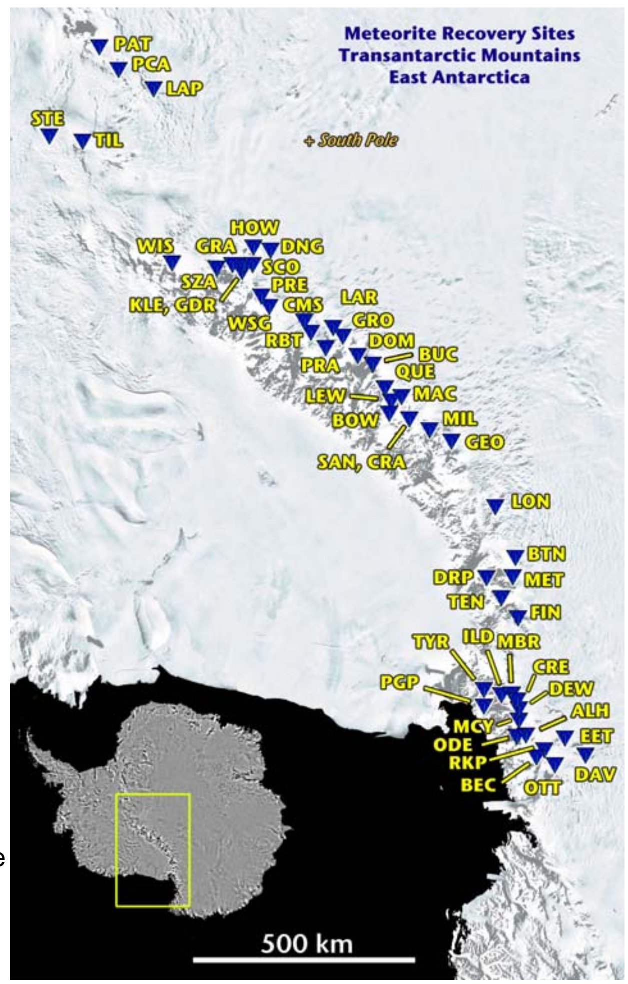

Table 1

List of Newly Classified Antarctic Meteorites **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 051 ~	197.0	L5 CHONDRITE	B/C	A/B		
DOM 10 052 ~	147.7	L5 CHONDRITE	B/C	A		
DOM 10 053 ~	93.2	LL6 CHONDRITE	B	B		
DOM 10 054 ~	77.7	LL6 CHONDRITE	B	A/B		
DOM 10 055 ~	67.8	L5 CHONDRITE	C	A		
DOM 10 056 ~	43.2	L5 CHONDRITE	B/C	A/B		
DOM 10 057 ~	67.0	LL6 CHONDRITE	B	A/B		
DOM 10 058 ~	67.9	LL6 CHONDRITE	B	B		
DOM 10 059 ~	33.7	L6 CHONDRITE	B/C	B		
DOM 10 060 ~	42.3	LL6 CHONDRITE	B	A		
DOM 10 061 ~	40.6	LL6 CHONDRITE	B/C	B		
DOM 10 062 ~	21.4	LL6 CHONDRITE	B	B		
DOM 10 063 ~	20.5	LL6 CHONDRITE	B	B		
DOM 10 064 ~	32.8	L5 CHONDRITE	C	A		
DOM 10 065 ~	27.0	LL6 CHONDRITE	B	A		
DOM 10 066 ~	28.0	LL6 CHONDRITE	B	A/B		
DOM 10 067 ~	19.6	LL6 CHONDRITE	B/C	B		
DOM 10 068 ~	24.0	LL6 CHONDRITE	B/C	B/C		
DOM 10 069 ~	19.6	H5 CHONDRITE	C	B		
DOM 10 070 ~	12.6	LL6 CHONDRITE	B/C	B		
DOM 10 071 ~	14.2	H6 CHONDRITE	C	A/B		
DOM 10 072 ~	17.9	L6 CHONDRITE	C	A/B		
DOM 10 073 ~	8.9	LL6 CHONDRITE	B	A/B		
DOM 10 074 ~	14.4	L6 CHONDRITE	C	B		
DOM 10 075 ~	22.0	LL6 CHONDRITE	B/C	B		
DOM 10 076 ~	18.5	L6 CHONDRITE	C	B		
DOM 10 077	8.6	CR2 CHONDRITE	B	A/B	2-31	14-23
DOM 10 078 ~	14.1	L5 CHONDRITE	B	B		
DOM 10 079 ~	23.3	LL6 CHONDRITE	B	B		
DOM 10 080 ~	15.1	L5 CHONDRITE	C	A/B		
DOM 10 081 ~	36.3	LL6 CHONDRITE	B	B		
DOM 10 082 ~	34.0	LL6 CHONDRITE	B	B		
DOM 10 083 ~	28.3	LL6 CHONDRITE	B/C	B		
DOM 10 084 ~	17.2	LL5 CHONDRITE	B	B		
DOM 10 085	18.2	CR2 CHONDRITE	C	B	0-4	.7-1.65
DOM 10 086 ~	23.6	L6 CHONDRITE	B/C	B		
DOM 10 087 ~	45.2	LL6 CHONDRITE	B/C	B		
DOM 10 088	34.0	EL6 CHONDRITE	B/C	B		0-1
DOM 10 089 ~	22.0	LL5 CHONDRITE	B/C	B		
DOM 10 090 ~	24.6	LL6 CHONDRITE	A/B	A/B		
DOM 10 091 ~	13.9	LL6 CHONDRITE	B/C	A		
DOM 10 092	8.4	LL CHONDRITE (IMPT MELT)	A/B	A	17-28	7-22
DOM 10 093 ~	15.6	L5 CHONDRITE	B/C	A		
DOM 10 094 ~	9.8	LL6 CHONDRITE	A/B	A/B		
DOM 10 095 ~	26.5	L6 CHONDRITE	B/C	A		
DOM 10 096 ~	24.5	LL6 CHONDRITE	B	A		
DOM 10 097 ~	18.1	L5 CHONDRITE	B/C	A		
DOM 10 098 ~	24.3	LL6 CHONDRITE	A/B	A		
DOM 10 099 ~	12.4	LL6 CHONDRITE	A/B	A		
DOM 10 101	241.8	CO3 CHONDRITE	Be	A/B	24-56	1-3

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 106 ~	36.8	L5 CHONDRITE	B	A		
DOM 10 107 ~	39.1	L5 CHONDRITE	B/C	A		
DOM 10 108 ~	32.3	LL6 CHONDRITE	A/B	A		
DOM 10 109 ~	52.7	LL6 CHONDRITE	B	A		
DOM 10 110 ~	44.5	LL6 CHONDRITE	B	B		
DOM 10 111 ~	15.8	LL6 CHONDRITE	B	B		
DOM 10 112 ~	41.5	LL6 CHONDRITE	B/C	B		
DOM 10 113 ~	18.0	H6 CHONDRITE	C	C		
DOM 10 114	11.0	L CHONDRITE (IMPACT MELT)	C	C	25-28	20
DOM 10 115 ~	22.4	LL6 CHONDRITE	C	C		
DOM 10 116 ~	59.5	LL6 CHONDRITE	B	B		
DOM 10 117 ~	39.9	LL6 CHONDRITE	B/C	B		
DOM 10 118 ~	33.9	LL6 CHONDRITE	B	B		
DOM 10 119 ~	21.0	L5 CHONDRITE	C	B		
DOM 10 130 ~	50.4	L5 CHONDRITE	B/C	A		
DOM 10 131 ~	72.3	L5 CHONDRITE	B/C	A/B		
DOM 10 132	65.0	H4 CHONDRITE	B/C	A/B	10-22	9-16
DOM 10 133 ~	45.9	LL6 CHONDRITE	A/B	A		
DOM 10 134 ~	90.0	LL6 CHONDRITE	B	A/B		
DOM 10 135 ~	77.0	LL6 CHONDRITE	B	A/B		
DOM 10 136 ~	110.9	LL6 CHONDRITE	A/B	A		
DOM 10 137 ~	126.0	LL6 CHONDRITE	A/B	A		
DOM 10 138 ~	95.3	LL6 CHONDRITE	A/B	A		
DOM 10 139 ~	58.8	LL6 CHONDRITE	B	A/B		
DOM 10 140 ~	223.8	LL5 CHONDRITE	A/B	A		
DOM 10 141 ~	177.5	LL5 CHONDRITE	A/B	A		
DOM 10 142 ~	253.8	LL6 CHONDRITE	B/C	B/C		
DOM 10 143 ~	124.6	LL6 CHONDRITE	B	B		
DOM 10 144 ~	80.7	LL6 CHONDRITE	B	B		
DOM 10 145 ~	71.4	LL6 CHONDRITE	B/C	B		
DOM 10 146 ~	42.4	LL6 CHONDRITE	B/C	B		
DOM 10 147	42.3	H5 CHONDRITE	B	B	18-19	16
DOM 10 148 ~	54.5	LL6 CHONDRITE	B/C	B		
DOM 10 149 ~	61.0	L5 CHONDRITE	B/C	B		
DOM 10 150 ~	23.0	LL6 CHONDRITE	B	A/B		
DOM 10 151 ~	31.9	LL6 CHONDRITE	B	A/B		
DOM 10 152 ~	34.3	LL6 CHONDRITE	B	A/B		
DOM 10 153 ~	35.6	LL6 CHONDRITE	A/B	A/B		
DOM 10 154 ~	27.3	LL5 CHONDRITE	B/C	B		
DOM 10 155 ~	53.0	LL5 CHONDRITE	B	A/B		
DOM 10 156 ~	36.2	LL6 CHONDRITE	B/C	B		
DOM 10 157 ~	23.9	LL5 CHONDRITE	B/C	A/B		
DOM 10 158 ~	12.0	H6 CHONDRITE	C	A/B		
DOM 10 159 ~	14.5	H6 CHONDRITE	C	B		
DOM 10 160 ~	5.9	L6 CHONDRITE	C	B		
DOM 10 161 ~	10.1	H5 CHONDRITE	C	B		
DOM 10 162 ~	14.7	LL6 CHONDRITE	B/C	A/B		
DOM 10 163 ~	10.4	LL6 CHONDRITE	C	A/B		
DOM 10 164 ~	11.3	L6 CHONDRITE	C	B		
DOM 10 166 ~	11.3	LL6 CHONDRITE	B/C	B		
DOM 10 167 ~	2.5	L6 CHONDRITE	C	A/B		
DOM 10 168 ~	14.0	LL6 CHONDRITE	B/C	B		
DOM 10 169 ~	15.0	LL6 CHONDRITE	B/C	B		
DOM 10 180 ~	19.6	L5 CHONDRITE	C	B/C		
DOM 10 181 ~	8.7	LL6 CHONDRITE	B/C	A/B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 182 ~	10.0	LL5 CHONDRITE	B/C	B		
DOM 10 183 ~	18.7	L6 CHONDRITE	C	B		
DOM 10 184 ~	30.0	LL6 CHONDRITE	B/C	B		
DOM 10 185 ~	21.1	LL6 CHONDRITE	B/C	B		
DOM 10 186 ~	34.1	H6 CHONDRITE	C	B		
DOM 10 187 ~	14.2	L6 CHONDRITE	C	B		
DOM 10 188 ~	21.6	H5 CHONDRITE	C	B		
DOM 10 189 ~	18.3	L6 CHONDRITE	C	B		
DOM 10 190 ~	90.4	LL6 CHONDRITE	B	B		
DOM 10 191 ~	46.2	LL6 CHONDRITE	B	B		
DOM 10 192 ~	65.7	LL6 CHONDRITE	A/B	B		
DOM 10 193 ~	65.4	LL5 CHONDRITE	A/B	B		
DOM 10 194 ~	73.0	LL6 CHONDRITE	B	B		
DOM 10 195 ~	98.8	L5 CHONDRITE	C	B		
DOM 10 196 ~	77.4	LL6 CHONDRITE	B	A/B		
DOM 10 197 ~	61.8	LL6 CHONDRITE	B	B		
DOM 10 198 ~	35.9	LL6 CHONDRITE	B	B		
DOM 10 199 ~	29.1	LL6 CHONDRITE	B/C	B		
DOM 10 200 ~	445.9	LL6 CHONDRITE	A/B	A		
DOM 10 201 ~	231.0	LL6 CHONDRITE	B/C	A		
DOM 10 202 ~	245.5	LL6 CHONDRITE	A/B	A/B		
DOM 10 203 ~	210.7	L5 CHONDRITE	B/Ce	A		
DOM 10 204 ~	136.1	H6 CHONDRITE	B/C	B		
DOM 10 205 ~	106.2	LL6 CHONDRITE	A/B	A		
DOM 10 206 ~	106.7	H6 CHONDRITE	B/C	A/B		
DOM 10 207 ~	133.0	LL6 CHONDRITE	A/B	A		
DOM 10 208 ~	133.0	L6 CHONDRITE	B/C	A/B		
DOM 10 209 ~	96.0	L5 CHONDRITE	B/Ce	A/B		
DOM 10 220 ~	78.9	LL6 CHONDRITE	B	B		
DOM 10 221 ~	52.2	LL6 CHONDRITE	B/C	B		
DOM 10 222 ~	46.8	LL6 CHONDRITE	B/C	B		
DOM 10 223 ~	49.8	LL6 CHONDRITE	B	B		
DOM 10 224 ~	49.6	LL6 CHONDRITE	B	A/B		
DOM 10 225 ~	60.0	LL6 CHONDRITE	B/C	B		
DOM 10 226 ~	32.7	LL6 CHONDRITE	B	B		
DOM 10 227 ~	44.4	LL6 CHONDRITE	B	B		
DOM 10 228 ~	59.3	L6 CHONDRITE	C	C		
DOM 10 229 ~	56.3	LL6 CHONDRITE	A/B	A/B		
DOM 10 230 ~	17.8	LL6 CHONDRITE	B	A/B		
DOM 10 231 ~	7.7	L6 CHONDRITE	C	B		
DOM 10 232 ~	10.5	L6 CHONDRITE	C	B		
DOM 10 233 ~	11.3	LL6 CHONDRITE	C	B		
DOM 10 234 ~	13.7	L6 CHONDRITE	C	B		
DOM 10 235 ~	9.1	L6 CHONDRITE	C	B		
DOM 10 236 ~	19.2	LL6 CHONDRITE	B/C	B		
DOM 10 237 ~	10.2	L6 CHONDRITE	C	B		
DOM 10 238 ~	9.2	LL6 CHONDRITE	B/C	B		
DOM 10 239 ~	18.8	LL6 CHONDRITE	B/C	B		
DOM 10 240 ~	110.5	LL6 CHONDRITE	A/B	A		
DOM 10 241 ~	102.5	LL6 CHONDRITE	B	B		
DOM 10 242 ~	72.7	LL6 CHONDRITE	B	B		
DOM 10 243 ~	52.4	LL6 CHONDRITE	B	A/B		
DOM 10 244 ~	103.2	LL6 CHONDRITE	A/B	A		
DOM 10 245 ~	46.0	LL6 CHONDRITE	B	B		
DOM 10 246 ~	79.4	LL6 CHONDRITE	B/C	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 247 ~	43.8	L6 CHONDRITE	C	B		
DOM 10 248 ~	49.4	L6 CHONDRITE	B/C	B		
DOM 10 249 ~	64.1	LL6 CHONDRITE	B	B		
DOM 10 257	11.7	CV3 CHONDRITE	B/C	A	0-3	1-8
DOM 10 260 ~	34.8	LL5 CHONDRITE	A/B	A/B		
DOM 10 261 ~	36.3	LL6 CHONDRITE	A/B	A/B		
DOM 10 262 ~	31.9	L6 CHONDRITE	B	B		
DOM 10 263 ~	30.8	LL6 CHONDRITE	B	B		
DOM 10 264 ~	21.3	LL6 CHONDRITE	B	B		
DOM 10 265 ~	16.9	LL6 CHONDRITE	B	B		
DOM 10 266 ~	28.4	LL6 CHONDRITE	B	B		
DOM 10 267 ~	33.5	LL6 CHONDRITE	B	B		
DOM 10 268 ~	36.5	LL5 CHONDRITE	A/B	A		
DOM 10 269 ~	36.6	LL6 CHONDRITE	A/B	A/B		
DOM 10 283	18.5	LL5 CHONDRITE	C	A	28	23
DOM 10 290 ~	48.3	LL6 CHONDRITE	B	B		
DOM 10 291 ~	39.6	LL6 CHONDRITE	B	B		
DOM 10 292 ~	44.9	LL6 CHONDRITE	A/B	A/B		
DOM 10 293 ~	41.2	L6 CHONDRITE	C	C		
DOM 10 294 ~	45.4	LL6 CHONDRITE	B	A/B		
DOM 10 295 ~	42.2	L5 CHONDRITE	C	B		
DOM 10 296 ~	48.6	LL6 CHONDRITE	B	B		
DOM 10 297 ~	28.9	LL6 CHONDRITE	B/C	B		
DOM 10 298 ~	46.2	L6 CHONDRITE	C	B/C		
DOM 10 300 ~	409.6	LL6 CHONDRITE	A/B	A/B		
DOM 10 301 ~	274.2	LL6 CHONDRITE	A/B	A/B		
DOM 10 302	227.1	L CHONDRITE (IMPACT MELT)	B/C	B	23-25	9-21
DOM 10 303 ~	324.4	LL6 CHONDRITE	A/B	A/B		
DOM 10 304 ~	131.2	LL6 CHONDRITE	A/B	A		
DOM 10 305 ~	87.7	H6 CHONDRITE	B/C	A		
DOM 10 306 ~	98.4	LL6 CHONDRITE	B	A/B		
DOM 10 307 ~	170.0	L5 CHONDRITE	B	A		
DOM 10 308 ~	98.7	LL6 CHONDRITE	A/B	A		
DOM 10 309 ~	71.4	LL6 CHONDRITE	B/C	A/B		
DOM 10 330 ~	16.3	LL6 CHONDRITE	A/B	A		
DOM 10 331 ~	17.9	L6 CHONDRITE	B	A/B		
DOM 10 332 ~	19.7	LL6 CHONDRITE	A/B	A		
DOM 10 333 ~	10.3	L6 CHONDRITE	B/C	A		
DOM 10 334 ~	36.1	LL5 CHONDRITE	B/C	A		
DOM 10 335 ~	19.4	L6 CHONDRITE	B/C	A		
DOM 10 336 ~	37.0	LL6 CHONDRITE	A/B	A		
DOM 10 337 ~	41.4	L6 CHONDRITE	B/C	A/B		
DOM 10 338 ~	52.2	L5 CHONDRITE	B/C	A/B		
DOM 10 339 ~	40.3	LL6 CHONDRITE	A/B	A		
DOM 10 340 ~	92.1	L6 CHONDRITE	B/C	A/B		
DOM 10 341 ~	57.7	L5 CHONDRITE	B/C	A/B		
DOM 10 342 ~	110.3	LL5 CHONDRITE	A/B	A/B		
DOM 10 343 ~	61.3	L5 CHONDRITE	A/B	A/B		
DOM 10 344	68.4	CR2 CHONDRITE	B	A	3-33	3-13
DOM 10 345 ~	71.2	LL6 CHONDRITE	A/B	A		
DOM 10 346 ~	59.1	LL6 CHONDRITE	B	A/B		
DOM 10 347 ~	74.5	H6 CHONDRITE	B/C	A		
DOM 10 348 ~	87.3	L5 CHONDRITE	B/C	A/B		
DOM 10 349 ~	106.5	LL6 CHONDRITE	A/B	A		
DOM 10 370 ~	18.3	L6 CHONDRITE	C	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 371 ~	24.6	L6 CHONDRITE	C	B		
DOM 10 372 ~	19.5	LL6 CHONDRITE	B/C	B		
DOM 10 373 ~	30.4	LL6 CHONDRITE	B/C	B		
DOM 10 374 ~	57.1	LL6 CHONDRITE	B/C	B/C		
DOM 10 375 ~	73.1	LL5 CHONDRITE	B	B		
DOM 10 376 ~	50.6	LL5 CHONDRITE	B	B		
DOM 10 377 ~	41.9	LL6 CHONDRITE	A	A/B		
DOM 10 378 ~	33.2	L6 CHONDRITE	C	B		
DOM 10 379 ~	91.5	LL6 CHONDRITE	A/B	B		
DOM 10 380 ~	19.4	LL6 CHONDRITE	B/C	B		
DOM 10 381 ~	31.9	LL6 CHONDRITE	B/C	B		
DOM 10 382 ~	23.0	LL6 CHONDRITE	B/C	B		
DOM 10 383 ~	29.2	L6 CHONDRITE	B/C	B		
DOM 10 384 ~	14.0	H6 CHONDRITE	C	B/C		
DOM 10 385 ~	22.4	LL6 CHONDRITE	B	B		
DOM 10 386 ~	16.9	LL6 CHONDRITE	B	B		
DOM 10 387 ~	13.9	L5 CHONDRITE	B	B		
DOM 10 388 ~	16.4	LL6 CHONDRITE	B	B		
DOM 10 389 ~	10.7	L6 CHONDRITE	C	C		
DOM 10 390 ~	99.8	LL6 CHONDRITE	B/C	A		
DOM 10 391 ~	139.7	LL6 CHONDRITE	A/B	A		
DOM 10 392 ~	179.5	L5 CHONDRITE	B/C	A/B		
DOM 10 393 ~	76.0	L6 CHONDRITE	B/C	A/B		
DOM 10 394 ~	73.6	LL6 CHONDRITE	A/B	A		
DOM 10 395 ~	53.0	LL6 CHONDRITE	A/B	A		
DOM 10 396 ~	73.2	LL6 CHONDRITE	A/B	A		
DOM 10 397 ~	59.0	L6 CHONDRITE	B/C	A		
DOM 10 398 ~	42.8	LL6 CHONDRITE	A/B	A		
DOM 10 399 ~	44.8	LL6 CHONDRITE	A/B	A		
DOM 10 420 ~	13.8	L6 CHONDRITE	B/C	A		
DOM 10 421 ~	18.8	L6 CHONDRITE	B/C	A/B		
DOM 10 422 ~	26.1	LL6 CHONDRITE	A/B	A		
DOM 10 423 ~	28.3	L5 CHONDRITE	A/B	A		
DOM 10 424 ~	22.6	LL6 CHONDRITE	B/C	A		
DOM 10 425 ~	41.5	LL6 CHONDRITE	A/B	A		
DOM 10 426 ~	57.0	LL6 CHONDRITE	A/B	A		
DOM 10 427 ~	39.9	L5 CHONDRITE	A/B	B		
DOM 10 428 ~	52.6	LL6 CHONDRITE	A/B	A		
DOM 10 429 ~	16.7	LL6 CHONDRITE	A/B	A		
DOM 10 450 ~	179.4	LL6 CHONDRITE	A/B	A/B		
DOM 10 451 ~	173.6	LL6 CHONDRITE	A/B	A		
DOM 10 452 ~	99.5	L5 CHONDRITE	B/C	A/B		
DOM 10 453 ~	75.1	LL6 CHONDRITE	B/C	A		
DOM 10 454 ~	196.4	L6 CHONDRITE	B/C	A/B		
DOM 10 460 ~	44.4	LL6 CHONDRITE	B	A/B		
DOM 10 461 ~	80.5	LL6 CHONDRITE	B	A/B		
DOM 10 462 ~	49.5	LL6 CHONDRITE	B/C	B		
DOM 10 463 ~	60.8	LL6 CHONDRITE	B/C	B		
DOM 10 464 ~	41.2	LL6 CHONDRITE	A/B	A/B		
DOM 10 465 ~	40.2	LL6 CHONDRITE	B/C	B		
DOM 10 466 ~	15.5	LL6 CHONDRITE	B	B		
DOM 10 467	28.3	CR2 CHONDRITE	B	B	6-29	1-13
DOM 10 468 ~	24.1	LL6 CHONDRITE	B	B		
DOM 10 469 ~	23.4	L5 CHONDRITE	B	B		
DOM 10 470 ~	22.7	LL6 CHONDRITE	A/B	A		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 471 ~	22.7	LL6 CHONDRITE	A/B	A		
DOM 10 472 ~	37.8	L5 CHONDRITE	B/C	A		
DOM 10 473 ~	42.5	LL6 CHONDRITE	A/B	A		
DOM 10 474 ~	39.0	LL6 CHONDRITE	A/B	A		
DOM 10 475 ~	29.5	LL6 CHONDRITE	A/B	A		
DOM 10 476 ~	32.3	LL5 CHONDRITE	B/C	A		
DOM 10 477 ~	27.0	L6 CHONDRITE	B/C	A/B		
DOM 10 478 ~	37.9	LL6 CHONDRITE	B/C	A/B		
DOM 10 479 ~	20.7	LL6 CHONDRITE	A/B	A		
DOM 10 491 ~	96.7	LL6 CHONDRITE	B	A/B		
DOM 10 492 ~	126.3	L6 CHONDRITE	C	B		
DOM 10 493 ~	265.9	L5 CHONDRITE	A/B	B		
DOM 10 494 ~	164.4	LL6 CHONDRITE	A/B	B		
DOM 10 520 ~	51.8	LL6 CHONDRITE	A	A		
DOM 10 521 ~	69.8	LL5 CHONDRITE	B	A/B		
DOM 10 522 ~	44.3	LL6 CHONDRITE	B/C	B		
DOM 10 523 ~	42.4	LL6 CHONDRITE	B/C	B		
DOM 10 524 ~	34.4	L5 CHONDRITE	C	B		
DOM 10 525 ~	46.8	LL6 CHONDRITE	B/C	B		
DOM 10 526 ~	21.3	L5 CHONDRITE	C	A/B		
DOM 10 527 ~	39.7	L6 CHONDRITE	A/B	B		
DOM 10 528 ~	24.8	LL6 CHONDRITE	A/B	B		
DOM 10 529 ~	18.9	LL6 CHONDRITE	C	B		
DOM 10 550 ~	89.7	L5 CHONDRITE	A/B	A/B		
DOM 10 551 ~	70.4	LL6 CHONDRITE	A/B	A/B		
DOM 10 552 ~	47.1	LL6 CHONDRITE	B/C	A		
DOM 10 553 ~	57.9	LL6 CHONDRITE	A/B	A		
DOM 10 554 ~	83.6	LL6 CHONDRITE	B/C	A		
DOM 10 555 ~	62.5	LL6 CHONDRITE	B/C	A/B		
DOM 10 557 ~	102.0	LL6 CHONDRITE	B	A/B		
DOM 10 558 ~	86.9	LL6 CHONDRITE	B/C	A/B		
DOM 10 559 ~	104.8	LL6 CHONDRITE	B/C	A/B		
DOM 10 570 ~	15.4	L5 CHONDRITE	B/C	B		
DOM 10 571 ~	22.4	LL6 CHONDRITE	B/C	B		
DOM 10 572 ~	18.1	L6 CHONDRITE	C	B		
DOM 10 573 ~	17.0	L6 CHONDRITE	C	B		
DOM 10 574 ~	35.8	LL6 CHONDRITE	B/C	B		
DOM 10 575 ~	17.2	L5 CHONDRITE	B/C	B		
DOM 10 576 ~	24.9	LL6 CHONDRITE	B	A/B		
DOM 10 577 ~	41.3	LL6 CHONDRITE	C	B		
DOM 10 578 ~	31.0	LL6 CHONDRITE	B/C	B		
DOM 10 579 ~	34.0	L5 CHONDRITE	C	B		
DOM 10 580 ~	53.8	LL6 CHONDRITE	A/B	A		
DOM 10 581 ~	69.5	LL5 CHONDRITE	B/C	A/B		
DOM 10 582 ~	45.2	L6 CHONDRITE	B/C	A		
DOM 10 583 ~	57.0	LL6 CHONDRITE	B/C	A		
DOM 10 584 ~	83.1	LL6 CHONDRITE	A/B	A		
DOM 10 585 ~	82.3	LL6 CHONDRITE	A/B	A		
DOM 10 586 ~	75.0	LL6 CHONDRITE	A/B	A		
DOM 10 587 ~	55.1	LL6 CHONDRITE	A/B	A		
DOM 10 588 ~	53.7	LL6 CHONDRITE	A/B	A		
DOM 10 589 ~	38.0	L6 CHONDRITE	B/C	A/B		
DOM 10 610 ~	43.0	H6 CHONDRITE	B/C	A		
DOM 10 611 ~	50.2	L5 CHONDRITE	B/C	A		
DOM 10 612 ~	43.6	LL6 CHONDRITE	B/C	A		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 613 ~	48.5	LL6 CHONDRITE	A/B	A/B		
DOM 10 614 ~	64.2	L5 CHONDRITE	A/B	A/B		
DOM 10 615 ~	66.1	L6 CHONDRITE	B/C	A/B		
DOM 10 616 ~	35.9	LL6 CHONDRITE	A/B	A		
DOM 10 617 ~	86.2	LL6 CHONDRITE	A/B	A/B		
DOM 10 618 ~	48.4	LL6 CHONDRITE	A/B	A		
DOM 10 619 ~	40.1	LL6 CHONDRITE	A/B	A		
DOM 10 620 ~	36.2	LL6 CHONDRITE	B/C	A		
DOM 10 622 ~	29.3	LL5 CHONDRITE	B	A/B		
DOM 10 623 ~	30.0	L5 CHONDRITE	B	A/B		
DOM 10 624 ~	40.6	LL5 CHONDRITE	B/C	A/B		
DOM 10 625 ~	28.8	LL6 CHONDRITE	B/C	A		
DOM 10 626 ~	20.8	LL5 CHONDRITE	B/C	A		
DOM 10 627 ~	31.8	LL6 CHONDRITE	A/B	A		
DOM 10 628 ~	41.0	LL6 CHONDRITE	B/C	A		
DOM 10 629 ~	38.0	LL6 CHONDRITE	A/B	A		
DOM 10 640 ~	35.5	LL6 CHONDRITE	B	A		
DOM 10 641 ~	36.6	LL6 CHONDRITE	B	A		
DOM 10 642 ~	27.1	LL6 CHONDRITE	B	A		
DOM 10 643 ~	36.3	LL6 CHONDRITE	B	A/B		
DOM 10 644 ~	20.7	LL5 CHONDRITE	A/B	A/B		
DOM 10 645 ~	26.2	L6 CHONDRITE	B/C	B		
DOM 10 646 ~	40.9	LL6 CHONDRITE	B	A		
DOM 10 647 ~	35.0	LL6 CHONDRITE	A/B	A		
DOM 10 648 ~	32.9	LL6 CHONDRITE	B/C	A		
DOM 10 649 ~	39.7	LL6 CHONDRITE	A/B	A		
DOM 10 650 ~	15.3	LL6 CHONDRITE	B/C	A		
DOM 10 651 ~	14.0	L5 CHONDRITE	B	A		
DOM 10 652 ~	28.3	LL6 CHONDRITE	A/B	A		
DOM 10 653 ~	29.9	LL6 CHONDRITE	B	A		
DOM 10 654 ~	35.1	LL6 CHONDRITE	A/B	A		
DOM 10 655 ~	52.3	LL6 CHONDRITE	A/B	A		
DOM 10 656 ~	52.2	LL6 CHONDRITE	A/B	A		
DOM 10 657 ~	69.0	LL6 CHONDRITE	B/C	A		
DOM 10 658 ~	24.9	LL5 CHONDRITE	B/C	B		
DOM 10 659 ~	34.1	LL6 CHONDRITE	A/B	A		
DOM 10 661 ~	9.7	L6 CHONDRITE	C	B		
DOM 10 663 ~	7.0	L6 CHONDRITE	C	B		
DOM 10 664 ~	14.9	LL6 CHONDRITE	C	B		
DOM 10 665 ~	9.2	L6 CHONDRITE	C	B		
DOM 10 666 ~	7.6	L6 CHONDRITE	C	B		
DOM 10 667 ~	10.0	LL6 CHONDRITE	B	A/B		
DOM 10 668 ~	2.8	L6 CHONDRITE	C	B		
DOM 10 669 ~	5.7	L6 CHONDRITE	C	B		
DOM 10 670 ~	26.9	LL6 CHONDRITE	B	A		
DOM 10 671 ~	15.8	LL6 CHONDRITE	B/C	A		
DOM 10 672 ~	15.7	LL6 CHONDRITE	B	A		
DOM 10 673 ~	28.2	LL6 CHONDRITE	B/C	A/B		
DOM 10 674 ~	22.6	LL6 CHONDRITE	B	A		
DOM 10 675 ~	25.1	LL5 CHONDRITE	B/Ce	A		
DOM 10 676 ~	18.7	LL6 CHONDRITE	A/B	A		
DOM 10 677 ~	36.9	LL6 CHONDRITE	B	A		
DOM 10 678 ~	32.6	L5 CHONDRITE	B/C	A/B		
DOM 10 679 ~	40.8	LL6 CHONDRITE	B	A		
DOM 10 680 ~	59.6	LL6 CHONDRITE	B	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 681 ~	71.1	LL6 CHONDRITE	B	B		
DOM 10 682 ~	40.4	L6 CHONDRITE	C	A/B		
DOM 10 683 ~	50.7	LL6 CHONDRITE	B	B		
DOM 10 684 ~	57.8	LL6 CHONDRITE	B	B		
DOM 10 685 ~	57.4	LL6 CHONDRITE	B	B		
DOM 10 686 ~	181.6	L6 CHONDRITE	C	A/B		
DOM 10 687 ~	73.9	LL6 CHONDRITE	B	B		
DOM 10 688 ~	156.1	LL6 CHONDRITE	B	B		
DOM 10 689 ~	210.6	LL6 CHONDRITE	A/B	B		
DOM 10 700 ~	41.2	LL6 CHONDRITE	A/B	A		
DOM 10 701 ~	69.1	LL5 CHONDRITE	A/B	A/B		
DOM 10 702 ~	54.0	LL6 CHONDRITE	A/B	A		
DOM 10 703 ~	66.5	LL6 CHONDRITE	A/B	A		
DOM 10 704 ~	65.4	LL6 CHONDRITE	A/B	A		
DOM 10 705 ~	80.4	LL6 CHONDRITE	A/B	A		
DOM 10 706 ~	47.7	LL6 CHONDRITE	B	A/B		
DOM 10 707 ~	36.0	L5 CHONDRITE	A/Be	A		
DOM 10 708 ~	31.9	LL6 CHONDRITE	B	A		
DOM 10 709 ~	49.7	LL6 CHONDRITE	B/C	A/B		
DOM 10 710 ~	21.8	LL6 CHONDRITE	C	B		
DOM 10 711 ~	34.3	LL6 CHONDRITE	B	A		
DOM 10 712 ~	26.2	LL6 CHONDRITE	C	A/B		
DOM 10 713 ~	33.2	LL6 CHONDRITE	B/C	C		
DOM 10 714 ~	23.4	L6 CHONDRITE	C	A		
DOM 10 715 ~	29.4	LL6 CHONDRITE	B/C	C		
DOM 10 716 ~	27.8	LL6 CHONDRITE	B/C	B/C		
DOM 10 717 ~	42.1	L6 CHONDRITE	C	A		
DOM 10 718 ~	34.1	LL6 CHONDRITE	B/C	B		
DOM 10 719 ~	31.3	LL6 CHONDRITE	B	A		
DOM 10 740 ~	23.4	L6 CHONDRITE	C	A/B		
DOM 10 742 ~	21.9	L6 CHONDRITE	B	B		
DOM 10 743 ~	32.2	L6 CHONDRITE	C	A/B		
DOM 10 744 ~	22.1	LL6 CHONDRITE	C	A/B		
DOM 10 745 ~	32.4	LL6 CHONDRITE	B/C	B		
DOM 10 746 ~	41.5	LL5 CHONDRITE	B/C	B		
DOM 10 747 ~	23.8	LL6 CHONDRITE	B/C	A/B		
DOM 10 748 ~	20.5	LL6 CHONDRITE	B/C	B		
DOM 10 749 ~	22.3	LL6 CHONDRITE	B/C	B		
DOM 10 760 ~	70.1	LL6 CHONDRITE	A/B	A		
DOM 10 761 ~	49.3	LL6 CHONDRITE	A/B	A		
DOM 10 762 ~	56.3	LL6 CHONDRITE	B	A		
DOM 10 763 ~	44.9	LL6 CHONDRITE	A/B	A/B		
DOM 10 764 ~	45.7	LL6 CHONDRITE	A/B	A		
DOM 10 765 ~	39.4	LL5 CHONDRITE	B/C	B		
DOM 10 766 ~	26.6	LL6 CHONDRITE	B	B		
DOM 10 767 ~	47.7	LL6 CHONDRITE	B/C	B		
DOM 10 768 ~	27.3	LL5 CHONDRITE	B/C	B		
DOM 10 769 ~	47.7	LL6 CHONDRITE	A/B	A/B		
DOM 10 770 ~	218.0	LL6 CHONDRITE	B	A/B		
DOM 10 771 ~	146.7	LL6 CHONDRITE	B	A/B		
DOM 10 772 ~	127.4	LL5 CHONDRITE	A/B	A/B		
DOM 10 773 ~	76.8	LL6 CHONDRITE	A/B	A		
DOM 10 774 ~	87.3	LL6 CHONDRITE	B	B		
DOM 10 775 ~	77.9	LL6 CHONDRITE	B	B		
DOM 10 776 ~	195.5	LL5 CHONDRITE	B	B		

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 777 ~	82.5	L6 CHONDRITE	C	B/C		
DOM 10 778 ~	29.9	LL6 CHONDRITE	B/C	B		
DOM 10 779 ~	29.7	LL6 CHONDRITE	B/C	B		
DOM 10 780 ~	57.4	LL6 CHONDRITE	B	A/B		
DOM 10 781 ~	50.0	LL5 CHONDRITE	B/C	B		
DOM 10 782 ~	59.4	LL6 CHONDRITE	B/C	B		
DOM 10 783 ~	101.3	LL6 CHONDRITE	B/C	B		
DOM 10 784 ~	72.9	L6 CHONDRITE	B/C	B		
DOM 10 785 ~	34.1	LL6 CHONDRITE	B	A/B		
DOM 10 786 ~	26.0	LL6 CHONDRITE	B/C	B		
DOM 10 787 ~	31.0	LL6 CHONDRITE	B/C	B		
DOM 10 788 ~	24.7	L5 CHONDRITE	C	A/B		
DOM 10 789 ~	23.1	LL6 CHONDRITE	C	B		
DOM 10 790 ~	23.1	LL6 CHONDRITE	B/C	B/C		
DOM 10 791 ~	42.7	LL6 CHONDRITE	B/C	B/C		
DOM 10 792 ~	38.3	LL6 CHONDRITE	B/C	B/C		
DOM 10 793 ~	37.1	LL6 CHONDRITE	B	A		
DOM 10 794 ~	18.8	LL6 CHONDRITE	B/C	B/C		
DOM 10 795 ~	14.2	L5 CHONDRITE	C	A		
DOM 10 796 ~	25.6	LL6 CHONDRITE	B/C	A		
DOM 10 797 ~	25.8	L6 CHONDRITE	C	A		
DOM 10 798 ~	36.1	LL6 CHONDRITE	B/C	A/B		
DOM 10 799 ~	25.9	LL6 CHONDRITE	B/C	A		
DOM 10 800 ~	125.3	LL5 CHONDRITE	A/B	A		
DOM 10 802 ~	203.7	LL5 CHONDRITE	B/C	A		
DOM 10 803 ~	75.5	LL6 CHONDRITE	A/B	A		
DOM 10 804 ~	87.6	LL6 CHONDRITE	A/B	A		
DOM 10 805 ~	66.7	LL6 CHONDRITE	B/C	A/B		
DOM 10 806 ~	65.5	LL5 CHONDRITE	B/C	A		
DOM 10 807	72.9	L4 CHONDRITE	B	A/B	23-24	20
DOM 10 808 ~	51.8	LL6 CHONDRITE	B/C	A		
DOM 10 809 ~	65.8	LL6 CHONDRITE	B/C	A		
DOM 10 820 ~	50.6	L6 CHONDRITE	B/C	A		
DOM 10 821 ~	41.5	LL6 CHONDRITE	B	A		
DOM 10 822 ~	40.6	LL6 CHONDRITE	A/B	A		
DOM 10 823 ~	40.1	L5 CHONDRITE	B/C	A		
DOM 10 824 ~	37.8	LL5 CHONDRITE	B/C	A		
DOM 10 825 ~	45.6	LL6 CHONDRITE	A/B	B		
DOM 10 826 ~	56.4	LL6 CHONDRITE	B/C	A		
DOM 10 827 ~	58.2	LL6 CHONDRITE	A/B	A/B		
DOM 10 828 ~	61.2	LL6 CHONDRITE	A/B	A/B		
DOM 10 829 ~	68.6	LL6 CHONDRITE	B/C	A		
DOM 10 830 ~	62.6	LL5 CHONDRITE	B/C	A		
DOM 10 831 ~	54.6	LL6 CHONDRITE	B/C	A		
DOM 10 832 ~	50.3	LL6 CHONDRITE	B	A		
DOM 10 833 ~	63.2	L5 CHONDRITE	B	A/B		
DOM 10 834 ~	75.4	LL6 CHONDRITE	B/C	A		
DOM 10 835 ~	39.7	LL6 CHONDRITE	B/C	A		
DOM 10 836 ~	30.7	LL6 CHONDRITE	B/C	A		
DOM 10 840 ~	118.6	LL6 CHONDRITE	B	A		
DOM 10 841 ~	90.0	LL6 CHONDRITE	B	A		
DOM 10 842 ~	48.4	L5 CHONDRITE	B/C	A		
DOM 10 843 ~	84.0	LL5 CHONDRITE	B	A		
DOM 10 844 ~	73.5	LL6 CHONDRITE	B	A		
DOM 10 845 ~	50.8	LL6 CHONDRITE	B/C	B		

Sample Number		Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
DOM 10 846	~	67.6	LL6 CHONDRITE	A/B	A		
DOM 10 847		97.2	CO3 CHONDRITE	B	A/B	14-35	0-1
DOM 10 848		104.6	H CHONDRITE (IMPACT MELT)	A/B	A/B	18-19	15-16
DOM 10 849		240.5	H6 CHONDRITE	B	A	17	15
DOM 10 850	~	75.1	LL6 CHONDRITE	B	A/B		
DOM 10 851	~	42.5	LL6 CHONDRITE	A/B	A		
DOM 10 852	~	53.9	LL6 CHONDRITE	A/B	A		
DOM 10 853	~	27.6	LL6 CHONDRITE	A/B	A		
DOM 10 854	~	24.2	L6 CHONDRITE	B/C	A		
DOM 10 855	~	23.1	LL5 CHONDRITE	A/B	A		
DOM 10 856	~	35.5	LL6 CHONDRITE	B	A		
DOM 10 857	~	20.2	LL6 CHONDRITE	B	A		
DOM 10 858	~	22.1	LL6 CHONDRITE	A/B	A		
DOM 10 859	~	17.7	LL6 CHONDRITE	A/B	A		
DOM 10 860	~	34.7	LL6 CHONDRITE	B	A/B		
DOM 10 861	~	25.9	LL6 CHONDRITE	B	A/B		
DOM 10 862	~	19.1	LL6 CHONDRITE	B	A/B		
DOM 10 863	~	36.0	L6 CHONDRITE	B/C	B		
DOM 10 864	~	28.6	LL6 CHONDRITE	B	A/B		
DOM 10 865	~	35.7	LL6 CHONDRITE	A/B	A		
DOM 10 866	~	19.8	L6 CHONDRITE	B/C	A		
DOM 10 867	~	19.0	LL6 CHONDRITE	A/B	A		
DOM 10 868	~	32.9	L6 CHONDRITE	B/C	A		
DOM 10 869	~	23.1	LL6 CHONDRITE	A/B	A		
DOM 10 870	~	18.8	LL6 CHONDRITE	C	B/C		
DOM 10 871	~	12.5	LL6 CHONDRITE	B	B		
DOM 10 872	~	11.9	LL6 CHONDRITE	B	B		
DOM 10 873	~	14.1	L5 CHONDRITE	C	B		
DOM 10 874	~	33.7	LL6 CHONDRITE	B	B		
DOM 10 875	~	20.8	LL6 CHONDRITE	B	B		
DOM 10 876	~	16.9	LL6 CHONDRITE	B/C	B		
DOM 10 877	~	24.4	L5 CHONDRITE	B/C	B		
DOM 10 878	~	26.7	LL6 CHONDRITE	B	B		
DOM 10 879	~	17.8	LL6 CHONDRITE	B/C	B		
DOM 10 880	~	6.4	LL6 CHONDRITE	B/C	B		
DOM 10 881	~	11.7	LL6 CHONDRITE	B	A/B		
DOM 10 882	~	15.6	LL6 CHONDRITE	B/C	B		
DOM 10 883	~	16.2	LL6 CHONDRITE	B/C	B		
DOM 10 884	~	5.5	L6 CHONDRITE	C	B		
DOM 10 885	~	10.9	LL6 CHONDRITE	B	B		
DOM 10 886	~	6.2	L6 CHONDRITE	C	B		
DOM 10 887	~	10.0	LL6 CHONDRITE	B	A/B		
DOM 10 888	~	10.4	LL6 CHONDRITE	C	B		
DOM 10 889	~	21.5	LL5 CHONDRITE	B/C	B		
DOM 10 901	~	19.0	LL5 CHONDRITE	B/C	A		
LAP 10 120	~	1.3	L6 CHONDRITE	B/C	A		
LAP 10 121	~	3.0	L6 CHONDRITE	B/C	A		
LAP 10 122	~	2.2	LL6 CHONDRITE	B	A		
LAP 10 123	~	1.0	L6 CHONDRITE	B/C	A		
LAP 10 124	~	3.2	L6 CHONDRITE	B/C	A		
LAP 10 125	~	4.5	L6 CHONDRITE	B/C	A		
LAP 10 126	~	2.3	LL5 CHONDRITE	A/B	A		
LAP 10 127	~	6.4	LL6 CHONDRITE	B/C	A		
LAP 10 128	~	3.1	L5 CHONDRITE	A/B	A		
LAP 10 129	~	11.2	LL5 CHONDRITE	A/B	A		

Table 2

Newly Classified Specimens Listed By Type

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
Carbonaceous Chondrites						
DOM 10101	241.8	CO3 CHONDRITE	Be	A/B	24-56	1-3
DOM 10847	97.2	CO3 CHONDRITE	B	A/B	14-35	0-1
DOM 10077	8.6	CR2 CHONDRITE	B	A/B	2-31	14-23
DOM 10085	18.2	CR2 CHONDRITE	C	B	0-4	0.7-1.65
DOM 10344	68.4	CR2 CHONDRITE	B	A	3-33	3-13
DOM 10467	28.3	CR2 CHONDRITE	B	B	6-29	1-13
DOM 10257	11.7	CV3 CHONDRITE	B/C	A	0-3	1-8
E Chondrite						
DOM 10088	34.0	EL6 CHONDRITE	B/C	B		0-1
H Chondrite						
DOM 10848	104.6	H CHONDRITE (IMPACT MELT)	A/B	A/B	18-19	15-16
L Chondrites						
DOM 10114	11.0	L CHONDRITE (IMPACT MELT)	C	C	25-28	20
DOM 10302	227.1	L CHONDRITE (IMPACT MELT)	B/C	B	23-25	9-21
DOM 10092	8.4	LL CHONDRITE (IMPACT MELT)	A/B	A	17-28	7-22

**Notes to Tables 1 and 2:

"Weathering" Categories:

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

"Fracturing" Categories:

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

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

Table 3

Tentative Pairings for New Meteorites

Table 3 summarizes possible pairings of the new specimens with each other and with previously classified specimens based on descriptive data in this newsletter issue. Readers who desire a more comprehensive review of the meteorite pairings in the U.S. Antarctic collection should refer to the compilation provided by Dr. E.R. D. Scott, as published in the Antarctic Meteorite Newsletter vol. 9 (no. 2) (June 1986). Possible pairings were updated in Meteoritical Bulletins 76, 79, 82 through 102, which are available online from the Meteoritical Society webpage:

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

CO3 CHONDRITE

DOM 10847 with DOM 10101

CR2 CHONDRITE

DOM 10344, DOM 10467 with DOM 10077

L CHONDRITE IMPACT MELT

DOM 10114, DOM 10302 with DOM 10440

Petrographic Descriptions

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10077	Dominion Range	17228	2.5 x 2.0 x 0.75	8.56	CR2 chondrite
DOM 10344		21109	4.5 x 3.8 x 1.5	68.363	
DOM 10467		21041	3.0 x 2.5 x 1.5	28.26	

Macroscopic Description: Kathleen McBride and Cecilia Satterwhite

These carbonaceous chondrites have brown/black fusion crust with oxidation haloes and rusty areas. The dark gray/black interior has abundant chondrules/inclusions of various sizes and color. Some metal is present.

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

These sections exhibit small (100-300 microns), well-defined, metal-rich grains, and up to 2mm chondrules and a few CAIs in a dark matrix of FeO-rich phyllosilicate. Polysynthetically twinned pyroxene is abundant. Silicates are unequilibrated; olivines range from $Fa_{2-33,}$ and pyroxenes from $Fs_{1-23}Wo_{0-2}$. These meteorites are CR2 chondrites and are similar enough to be initially paired.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10085	Dominion Range	17216	3.0 x 2.0 x 1.5	18.15	CR2 chondrite

Macroscopic Description: Kathleen McBride

The exterior of this CR2 has a patch of black fusion crust. The interior is rusty black with no visible features.

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

The section exhibits a distinct lineation with a few small (100-300 microns) metal-rich chondrules and a few CAIs in a dark matrix of FeO-rich phyllosilicate. Polysynthetically twinned pyroxene is abundant. Small metal grains show “fizzed” texture and some silicates show mosaicism indicating moderate to strong shock. Silicates are unequilibrated; olivines range from Fa_{0-5}, with most Fa_1 and pyroxenes from $Fs_{0-1}Wo_{0-2}$. The meteorite is probably a CR2 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10088	Dominion Range	17204	6.25 x 3.25 x 1.0	33.97	EL6 chondrite

Macroscopic Description: Kathleen McBride

This enstatite chondrite has no fusion crust on the exterior. The interior is gray with some rust and a black vein. Some gray chondrules are visible.

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

No traces of chondritic structure are visible in the thin section, which shows the meteorite to consist largely of comminuted or granular enstatite (grain size 0.1-0.2 mm), a considerable amount of nickel-iron, and minor amounts of sulfides and plagioclase. The meteorite is mildly weathered. Microprobe analyses show that the enstatite is almost pure $MgSiO_3$ (FeO 0.1-0.3%); on average, the nickel-iron contains 0.9% Si. The meteorite is an EL6 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10092	Dominion Range	17207	2.4 x 2.0 x 1.3	8.40	LL chondrite (impact melt)

Macroscopic Description: Cecilia Satterwhite

The exterior has fractured black fusion crust with some oxidation. The interior is light gray with some darker gray heavily weathered areas along the edges. Some metal is visible.

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

The section exhibits two textures; one side is a fine-grained, melt-textured matrix of olivine and pyroxene (1-10 microns) with fragments of mineral grains (200-300 micron grain size) and the other, chondrules and chondrule fragments with abundant fractures. The mineral compositions are slightly unequilibrated; olivine is Fa_{17-28} and pyroxene is Fs_{7-22}. The meteorite is an LL chondrite impact melt.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10101	Dominion Range	21175	5.5 x 6.0 x 4.0	241.8	CO3 chondrite
DOM 10847		21899	6.0 x 5.5 x 2.2	97.197	

Macroscopic Description: Cecilia Satterwhite

The exteriors have black fusion crust, fractured and frothy in areas with some oxidation. Areas without fusion crust are weathered brown with some evaporites visible. The interiors are a black matrix with heavy oxidation and small white inclusions visible.

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

The sections consist of abundant small (up to 1 mm) chondrules, chondrule fragments and mineral grains in a dark matrix. Metal and sulfide occur both within and rimming the chondrules. Olivine ranges in composition from Fa_{14-56}, with a continuous range of intermediate compositions and an average at Fa_{31-35}. Pyroxenes range $Fs_{1-9}Wo_{1-3}$. The matrix appears to consist largely of Fe-rich olivine. These meteorites are CO3 chondrites and are likely paired.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10114	Dominion Range	21938	2.0 x 2.0 x 1.5	10.95	L chondrite (impact melt)
DOM 10302		21942	6.0 x 4.8 x 3.0	227.1	

Macroscopic Description: Kathleen McBride and Cecilia Satterwhite

The exteriors of these impact melts are fractured with dark brown to black fusion crust with oxidation haloes. The dark gray to black matrix is heavily oxidized with rust and metal.

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

The section consists dominantly of individual clasts containing shocked chondrule fragments. Many of the silicates are mosaicized. Metal-sulfide melt textures are present, with most of the metal found in the veins between clasts. Veins are, for the most part, completely opaque. Olivine compositions are Fa_{23-28} and pyroxene is Fs_{20-21}. These meteorites are shock blackened impact melt breccias of an L chondrite precursor. These meteorites are similar enough for an initial pairing, and are also similar to DOM 10440.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10257	Dominion Range	20362	2.5 x 1.4 x 2.0	11.72	CV3 chondrite

Macroscopic Description: Cecilia Satterwhite

The exterior has brown/black fusion crust with some oxidation and some chondrules/inclusions visible. The interior is dark gray to black with abundant rusty inclusions, chondrules and metal.

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

The section exhibits large chondrules (up to 3 mm) and CAIs in a dark, weathered matrix. Olivines range from Fa_{0-3} and Fs_{1-8}. The meteorite is an unequilibrated CV3 chondrite.

Sample No.	Location	Field No.	Dimensions (cm)	Weight (g)	Classification
DOM 10848	Dominion Range	21853	6.0 x 5.4 x 1.2	104.589	H chondrite (impact melt)

Macroscopic Description: Cecilia Satterwhite

98% of the exterior is covered with pitted brown/black fusion crust with oxidation haloes. The interior is a dark gray matrix with metal and some lighter chondrules/inclusions. Some areas are a rusty brown with thick dark black veins running through the center.

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

The section consists of shocked chondrules and chondrule fragments. Chondrules and fragments show moderate shock effects including minor mosaicism. A 6mm wide melt vein dominates the section with metal and sulfide occurring as stringers within the vein. The vein is completely opaque. Olivine compositions are Fa_{18-19} and pyroxene is Fs_{15-16}. The meteorite is an H6 chondrite impact melt.

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 7, 2014 deadline** will be reviewed at the MWG meeting on **March 22, 2014 in Houston, TX.** Requests that are received after the deadline may be delayed for review until MWG meets again in the Fall of 2014. Please submit your requests on time. Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax 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 National Science Foundation, and all allocations are subject to recall.

Samples can be requested from any meteorite that has been made available through announcement in any issue of the ***Antarctic Meteorite Newsletter*** (beginning with 1(1) in June, 1978). Many of the meteorites have also been described in five *Smithsonian Contributions to the Earth Sciences*: Nos. 23, 24, 26, 28, and 30. Tables containing all classified meteorites as of August 2006 have been published in the Meteoritical Bulletins and *Meteoritics* and *Meteoritics and Planetary Science* (these are listed in Table 3 of this newsletter. They are also available online at:

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

The most current listing is found online at:

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

JSC Curator, Antarctic meteorites	http://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://artscilabs.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/
Museo Nazionale dell'Antartide	http://www.mna.it/english/Collections/collezioni_set.htm
BMNH general meteorites	http://www.nhm.ac.uk/research-curation/departments/mineralogy/research-groups/meteoritics/index.html
Chinese Antarctic meteorite collection	http://birds.chinare.org.cn/en/yunshiku/
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://meteoritics.org/
Meteorite! Magazine	http://www.meteoritemag.org/
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/

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/