Antarctic Meteorite Newsletter

Volume 27, Number 3 August 2004

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

Curator's Comments

New Meteorites

This newsletter contains classifications for 402 new meteorites from the 2002 and 2003 ANSMET collections. They include samples from MacAlpine Hill, LaPaz Ice Field, Pecora Escarpment, and the last from the Queen Alexandra Range region. Detailed macroscopic and petrographic descriptions are given for 33 of the new meteorites. After a long dry-spell, a new martian meteorite has appeared in the ANSMET collections. MIL 03346, a 715.2 g nakhlite, was the subject of a special newsletter last month. It is the first nakhlite to be part of the ANSMET collections, and the first martian meteorite recovered by this group since QUE 94210. In addition to this exciting meteorite are a variety of interesting new samples including a lunar basalt (paired with LAP 02205 from the previous newsletter), 5 irons (three are sulfide-rich), a ureilite, an unbrecciated eucrite, 4 diogenites (two are olivine-bearing), 4 aubrites (one is anomalous), 13 carbonaceous chondrites, an enstatite chondrite, and an H chondrite impact melt. The diversity of meteorites in this newsletter is a testament to the richness of the meteorite population in the LaPaz Ice Field.

Lunar Meteorite Compendium

Work has begun on a Lunar Meteorite Compendium. Allan Hills 81005, the first recognized lunar meteorite, will be the first chapter to be completed, and will include some of the original photographs taken during processing of this ~31 g meteorite. Processing sketches and genealogy charts have also been prepared and will be presented for this sample. It is expected that this compendium will be available in both a CD-ROM and website formats, but a detailed schedule for production has not been developed. Stay tuned for more information on this topic. In the meantime, if you have some lunar meteorite publications that you think may be relevant to such a project, please send them to *kevin.righter-1@nasa.gov*. A few of you have done this already, and it has been very beneficial – thank you!

Additions to our website and database

Numerous photographs of Antarctic meteorites were taken before 1997, but have not been available in digital format. These have been maintained in our data archives. We have also begun to add images of the more popular and well-studied meteorites to our webpage, so that investigators can have access to as much information about the samples as possible. For instance, NASA JSC laboratory photos of special meteorites such as angrite LEW 86010, or the ungrouped carbonaceous chondrite, MAC 87300, are now available as a link from the classification database. It is our goal to eventually have all available images online.

Inside this Issue

Sample Request Deadline
Sept. 03, 2004

MWG Meets
Sept. 23-24, 2004

New Meteorites

2002-2003 Collection

Pages 3-20 contain preliminary descriptions and classifications of meteorites that were completed since publication of issue 27(1), Mar. 2004. 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 inital 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
CRE — Mt. Crean
DAV — David Glacier
DEW — Mt. DeWitt
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
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
PRE — Mt. Prestrud
QUE — Queen Alexandra Range
RKP — Reckling Peak
SCO — Scott Glacier
STE — Stewart Hills
TEN — Tentacle Ridge
TIL — Thiel Mountains
TYR — Taylor Glacier
WIS — Wisconsin Range
WSG — Mt. Wisting

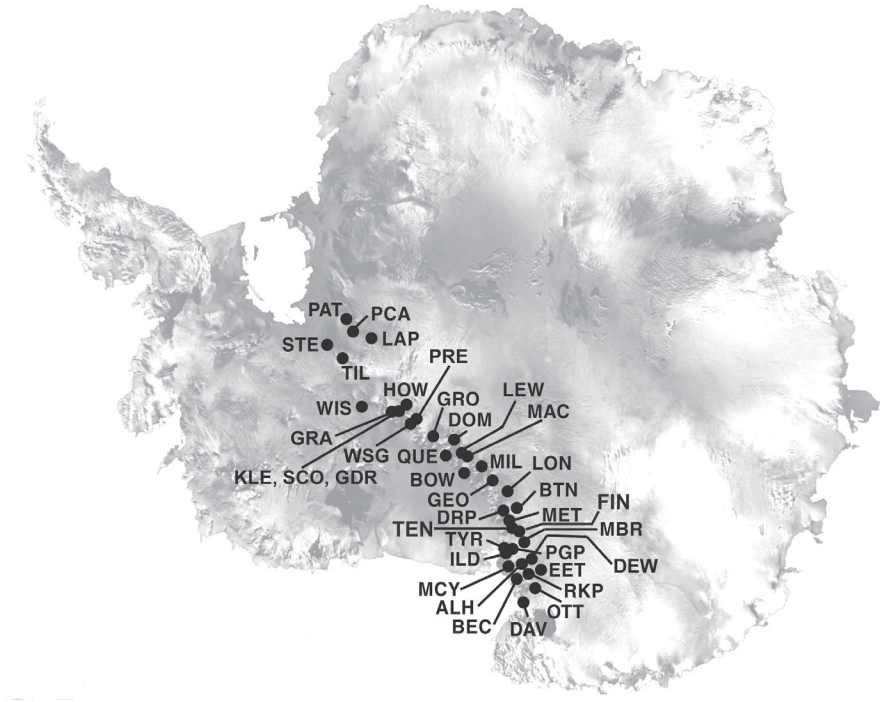

Table 1
List of Newly Classified Antarctic Meteorites **

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 02 209 ~	1563.1	LL5 CHONDRITE	A/B	A		
LAP 02 210 ~	2237.6	LL5 CHONDRITE	A	A		
LAP 02 213 ~	592.6	LL5 CHONDRITE	A/B	A		
LAP 02 214 ~	745.1	LL5 CHONDRITE	A/B	A		
LAP 02 218 ~	473.7	L4 CHONDRITE	A/B	A/B		
LAP 02 230 ~	218.7	LL6 CHONDRITE	A/B	A		
LAP 02 232 ~	230.9	LL6 CHONDRITE	A/B	A		
LAP 02 234 ~	24.2	LL6 CHONDRITE	A/B	A/B		
LAP 02 235	31.1	L5 CHONDRITE	B/C	A/B	23	20
LAP 02 236 ~	40.0	LL5 CHONDRITE	A/B	A		
LAP 02 240	28.2	H CHONDRITE (IMPACT MELT)	C	A/B	18	16
LAP 02 241 ~	106.0	LL5 CHONDRITE	A/BE	A		
LAP 02 242 ~	6.9	H5 CHONDRITE	B	A		
LAP 02 243 ~	11.7	H5 CHONDRITE	B/C	A/B		
LAP 02 244 ~	106.5	LL5 CHONDRITE	A/B	A		
LAP 02 245 ~	108.4	LL5 CHONDRITE	A/B	A/B		
LAP 02 246 ~	127.4	LL5 CHONDRITE	A/B	A		
LAP 02 247 ~	25.3	H5 CHONDRITE	B/C	A		
LAP 02 248 ~	68.0	LL5 CHONDRITE	A/B	A		
LAP 02 249 ~	20.7	LL4 CHONDRITE	A/B	A/B		
LAP 02 250 ~	94.3	LL5 CHONDRITE	A/B	A/B		
LAP 02 251	119.0	L4 CHONDRITE	C	A	23	19
LAP 02 252 ~	20.8	H6 CHONDRITE	C	C		
LAP 02 253 ~	78.7	LL5 CHONDRITE	A/B	A/B		
LAP 02 254	114.6	H5 CHONDRITE	A/B	A	19	16
LAP 02 255 ~	94.8	LL5 CHONDRITE	A/B	A/B		
LAP 02 256 ~	162.8	L5 CHONDRITE	A	A		
LAP 02 257 ~	132.3	LL5 CHONDRITE	A/B	A		
LAP 02 258 ~	32.9	LL5 CHONDRITE	A/B	A		
LAP 02 259 ~	54.6	LL5 CHONDRITE	A	A/B		
LAP 02 260 ~	144.9	LL5 CHONDRITE	A/B	A		
LAP 02 261 ~	118.3	LL5 CHONDRITE	B	A/B		
LAP 02 262 ~	45.3	LL5 CHONDRITE	A/B	A/B		
LAP 02 263 ~	92.2	LL5 CHONDRITE	A/B	A/B		
LAP 02 264 ~	60.3	L5 CHONDRITE	B/C	A/B		
LAP 02 265 ~	52.1	LL5 CHONDRITE	B	A/B		
LAP 02 266 ~	141.9	LL4 CHONDRITE	A	A		
LAP 02 267 ~	39.9	H6 CHONDRITE	C	C		
LAP 02 268 ~	17.8	L5 CHONDRITE	B/C	A/B		
LAP 02 269	24.2	CM2 CHONDRITE	B	B	0-27	
LAP 02 271 ~	9.2	LL5 CHONDRITE	A	A		
LAP 02 273 ~	25.3	LL5 CHONDRITE	A	A/B		
LAP 02 274 ~	26.2	H6 CHONDRITE	C	A/B		
LAP 02 275 ~	38.2	LL5 CHONDRITE	B	A		
LAP 02 276 ~	44.2	LL5 CHONDRITE	B	A		
LAP 02 277	7.8	CM1 CHONDRITE	A	A/B		
LAP 02 278 ~	3.4	H5 CHONDRITE	C	B		
LAP 02 279 ~	5.3	L5 CHONDRITE	C	B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 02 280 ~	17.2	H5 CHONDRITE	C	B		
LAP 02 281 ~	18.8	LL5 CHONDRITE	A/B	A/B		
LAP 02 282 ~	4.3	LL5 CHONDRITE	B	B		
LAP 02 283 ~	37.1	LL5 CHONDRITE	A/B	A/B		
LAP 02 284 ~	7.0	L5 CHONDRITE	B	A/B		
LAP 02 285 ~	4.9	LL5 CHONDRITE	C	B		
LAP 02 286 ~	6.6	L5 CHONDRITE	B	B		
LAP 02 287 ~	10.2	LL5 CHONDRITE	B	A/B		
LAP 02 288 ~	6.3	LL5 CHONDRITE	A/B	B		
LAP 02 289 ~	9.7	H5 CHONDRITE	C	B		
LAP 02 290 ~	7.5	L5 CHONDRITE	C	A		
LAP 02 291 ~	3.5	H5 CHONDRITE	C	A/B		
LAP 02 292	16.6	L5 CHONDRITE	B	B	24	20
LAP 02 293 ~	16.5	LL5 CHONDRITE	A/B	B		
LAP 02 294 ~	17.4	H5 CHONDRITE	B/C	B		
LAP 02 295 ~	8.2	H6 CHONDRITE	C	C		
LAP 02 296 ~	7.0	L5 CHONDRITE	C	B		
LAP 02 297 ~	17.7	H5 CHONDRITE	C	B/C		
LAP 02 298 ~	17.0	L5 CHONDRITE	A/B	A/B		
LAP 02 299 ~	9.1	L5 CHONDRITE	A	A		
LAP 02 300 ~	108.5	LL5 CHONDRITE	B	A		
LAP 02 301 ~	9.2	LL5 CHONDRITE	C	A		
LAP 02 302	7.9	CM2 CHONDRITE	B/C	B	1-34	
LAP 02 303 ~	9.9	H5 CHONDRITE	C	A/B		
LAP 02 304 ~	13.5	LL5 CHONDRITE	B	A		
LAP 02 305 ~	45.2	L5 CHONDRITE	B	A		
LAP 02 306 ~	7.4	L5 CHONDRITE	C	A/B		
LAP 02 307 ~	8.4	H5 CHONDRITE	C	B		
LAP 02 308	14.1	CM2 CHONDRITE	B/C	B	0-7	1
LAP 02 309 ~	34.3	LL5 CHONDRITE	A/B	A/B		
LAP 02 320 ~	2626.4	LL5 CHONDRITE	A/B	A/B		
LAP 02 321 ~	1046.0	LL5 CHONDRITE	A	A/B		
LAP 02 322 ~	452.7	LL5 CHONDRITE	A/B	A		
LAP 02 323 ~	507.1	LL5 CHONDRITE	A/B	A		
LAP 02 324 ~	332.4	LL5 CHONDRITE	A/B	A		
LAP 02 325 ~	425.3	LL5 CHONDRITE	B	A/B		
LAP 02 326 ~	369.3	LL5 CHONDRITE	A/B	A/B		
LAP 02 327 ~	254.4	LL5 CHONDRITE	B	A		
LAP 02 328 ~	432.2	LL5 CHONDRITE	B	A		
LAP 02 329 ~	403.9	LL5 CHONDRITE	B	A		
LAP 02 330 ~	218.5	LL5 CHONDRITE	A/B	A		
LAP 02 331 ~	190.9	L5 CHONDRITE	A/B	A		
LAP 02 332 ~	168.8	L5 CHONDRITE	C	B/C		
LAP 02 334 ~	135.1	LL6 CHONDRITE	A/B	A/B		
LAP 02 335 ~	180.1	LL5 CHONDRITE	A/B	A		
LAP 02 336	85.6	CM2 CHONDRITE	B	B	0-42	
LAP 02 338	218.3	L4 CHONDRITE	B	A	23	4-21
LAP 02 339 ~	169.4	LL5 CHONDRITE	A/B	A		
LAP 02 340 ~	65.4	LL5 CHONDRITE	B	A		
LAP 02 341	103.7	H6 CHONDRITE	A	A	18	16
LAP 02 342	42.4	CR2 CHONDRITE	A/B	A/B	0-5	1-3
LAP 02 343 ~	14.4	LL5 CHONDRITE	A/B	A/B		
LAP 02 344 ~	27.5	LL5 CHONDRITE	A	A		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 02 345 ~	9.4	LL5 CHONDRITE	B	B		
LAP 02 346 ~	14.1	L5 CHONDRITE	A/B	A/B		
LAP 02 347 ~	41.0	LL5 CHONDRITE	A/B	A/B		
LAP 02 348	6.9	CM2 CHONDRITE	B	A	0-3	
LAP 02 349	26.0	CM2 CHONDRITE	B	B/C	0-45	
LAP 02 370 ~	1.2	H5 CHONDRITE	C	A		
LAP 02 371 ~	213.2	LL5 CHONDRITE	B/C	A/B		
LAP 02 372 ~	181.1	LL5 CHONDRITE	B	A		
LAP 02 373 ~	168.0	LL5 CHONDRITE	B	A		
LAP 02 374 ~	136.0	L5 CHONDRITE	B	A		
LAP 02 375 ~	109.9	LL5 CHONDRITE	A/B	A		
LAP 02 376 ~	103.6	LL5 CHONDRITE	B	B		
LAP 02 377 ~	130.5	LL5 CHONDRITE	A/B	A/B		
LAP 02 378 ~	88.7	LL6 CHONDRITE	B	B		
LAP 02 379 ~	85.5	LL6 CHONDRITE	B	A/B		
LAP 02 380 ~	162.8	H6 CHONDRITE	C	B		
LAP 02 381 ~	76.0	LL5 CHONDRITE	A	A/B		
LAP 02 382	74.3	UREILITE	B	B	12-21	15-18
LAP 02 383 ~	51.1	LL5 CHONDRITE	B	A/B		
LAP 02 384 ~	35.0	H6 CHONDRITE	C	A/B		
LAP 02 385 ~	40.7	LL5 CHONDRITE	A	A/B		
LAP 02 386 ~	51.4	L5 CHONDRITE	B/C	B		
LAP 02 387 ~	38.8	LL5 CHONDRITE	B/C	B		
LAP 02 388 ~	24.7	LL5 CHONDRITE	B	A/B		
LAP 02 389 ~	33.8	L5 CHONDRITE	B/C	B		
LAP 02 390 ~	26.5	LL5 CHONDRITE	B	A/B		
LAP 02 391 ~	5.6	LL5 CHONDRITE	A	A		
LAP 02 392 ~	22.5	LL5 CHONDRITE	B	A/B		
LAP 02 393 ~	10.0	LL5 CHONDRITE	B	A/B		
LAP 02 394 ~	8.6	L5 CHONDRITE	B	A		
LAP 02 395 ~	18.1	LL5 CHONDRITE	B	B		
LAP 02 396 ~	28.2	L5 CHONDRITE	B	B/C		
LAP 02 397 ~	46.2	LL5 CHONDRITE	B	B		
LAP 02 398 ~	35.4	L5 CHONDRITE	C	B/C		
LAP 02 399 ~	5.8	L5 CHONDRITE	C	B/C		
LAP 02 400 ~	29.6	L5 CHONDRITE	B/C	A		
LAP 02 401 ~	30.1	L5 CHONDRITE	B/C	A		
LAP 02 402 ~	36.4	LL5 CHONDRITE	A/B	A		
LAP 02 403 ~	5.9	LL5 CHONDRITE	A/B	A/B		
LAP 02 404 ~	10.1	L5 CHONDRITE	B/C	A		
LAP 02 405 ~	8.7	H5 CHONDRITE	C	A		
LAP 02 406 ~	8.3	L5 CHONDRITE	B/C	A		
LAP 02 407 ~	40.5	LL5 CHONDRITE	A/B	A/B		
LAP 02 408 ~	21.8	LL5 CHONDRITE	A/B	A		
LAP 02 409 ~	22.9	LL5 CHONDRITE	B	A		
LAP 02 410 ~	77.5	L5 CHONDRITE	B	A/B		
LAP 02 411 ~	122.5	LL5 CHONDRITE	B	A		
LAP 02 412 ~	172.4	LL5 CHONDRITE	B	A		
LAP 02 413 ~	41.8	LL5 CHONDRITE	B	A		
LAP 02 414 ~	42.0	LL5 CHONDRITE	B	A		
LAP 02 415 ~	34.7	LL5 CHONDRITE	B/C	A/B		
LAP 02 416 ~	44.2	LL5 CHONDRITE	B	A		
LAP 02 417 ~	3.1	L5 CHONDRITE	C	C		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
LAP 02 418 ~	54.6	LL5 CHONDRITE	B	B		
LAP 02 419 ~	17.5	LL5 CHONDRITE	B	A		
LAP 02 420 ~	15.1	LL5 CHONDRITE	A	A		
LAP 02 421 ~	18.9	LL5 CHONDRITE	B/C	A/B		
LAP 02 422	2.0	CM1 CHONDRITE	B	B		
LAP 02 423 ~	6.2	LL5 CHONDRITE	A	A		
LAP 02 424 ~	3.6	H5 CHONDRITE	C	A		
LAP 02 425 ~	6.0	L5 CHONDRITE	C	A/B		
LAP 02 426 ~	7.6	L5 CHONDRITE	A	A		
LAP 02 427 ~	2.6	L5 CHONDRITE	C	A/B		
LAP 02 428 ~	13.4	LL5 CHONDRITE	A	A		
LAP 02 429 ~	6.5	H5 CHONDRITE	C	A		
MAC 02 472 ~	2.6	L5 CHONDRITE	C	A/B		
MAC 02 474 ~	3.1	H6 CHONDRITE	C	A/B		
MAC 02 475 ~	6.6	H5 CHONDRITE	C	A		
MAC 02 476 ~	6.8	H5 CHONDRITE	C	A/B		
MAC 02 477 ~	5.9	H5 CHONDRITE	C	A/B		
MAC 02 478 ~	8.8	H5 CHONDRITE	C	A/B		
MAC 02 479 ~	0.4	H6 CHONDRITE	B/C	A		
MAC 02 480 ~	1.8	H5 CHONDRITE	CE	B		
MAC 02 481 ~	1.0	H6 CHONDRITE	C	A		
MAC 02 482 ~	2.5	H5 CHONDRITE	C	A		
MAC 02 483 ~	0.6	H4 CHONDRITE	C	A		
MAC 02 485 ~	4.0	H5 CHONDRITE	C	A		
MAC 02 486 ~	10.5	L4 CHONDRITE	C	A		
MAC 02 487 ~	17.6	H5 CHONDRITE	C	A		
MAC 02 488 ~	20.9	L6 CHONDRITE	C	A		
MAC 02 489 ~	6.0	H5 CHONDRITE	C	A		
MAC 02 520 ~	9.5	H6 CHONDRITE	C	A		
MAC 02 523 ~	3.5	LL5 CHONDRITE	B/C	A		
MAC 02 524 ~	2.4	H6 CHONDRITE	C	A		
MAC 02 525 ~	0.2	H6 CHONDRITE	B	A		
MAC 02 526 ~	0.2	LL6 CHONDRITE	B	A		
MAC 02 528	5.6	CV3 CHONDRITE	A/B	A/B	0-3	0-3
MAC 02 529 ~	3.0	H6 CHONDRITE	C	A/B		
MAC 02 556	1.4	E3 CHONDRITE	C	A		0-1
MAC 02 610 ~	2.6	H5 CHONDRITE	C	B/C		
MAC 02 611 ~	7.8	H5 CHONDRITE	C	B		
MAC 02 612 ~	19.0	H5 CHONDRITE	C	A/B		
MAC 02 613 ~	1.4	LL5 CHONDRITE	B/C	B		
MAC 02 614 ~	5.9	H5 CHONDRITE	C	B		
MAC 02 616 ~	7.3	H5 CHONDRITE	C	A/B		
MAC 02 617 ~	5.3	H6 CHONDRITE	C	B		
MAC 02 618 ~	4.0	H5 CHONDRITE	C	B		
MAC 02 619 ~	8.1	L4 CHONDRITE	CE	B		
MAC 02 641 ~	2.6	H5 CHONDRITE	C	B		
MAC 02 642 ~	1.8	L5 CHONDRITE	C	B		
MAC 02 643 ~	9.6	H5 CHONDRITE	C	A/B		
MAC 02 644 ~	23.3	H5 CHONDRITE	C	B		
MAC 02 645 ~	3.2	H5 CHONDRITE	C	A/B		
MAC 02 646 ~	7.6	H6 CHONDRITE	C	A/B		
MAC 02 647 ~	2.6	H6 CHONDRITE	C	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
MAC 02 648 ~	5.1	H5 CHONDRITE	C	A/B		
MAC 02 649 ~	0.2	H6 CHONDRITE	C	B		
MAC 02 650 ~	0.4	H5 CHONDRITE	B/C	A		
MAC 02 651 ~	0.4	H6 CHONDRITE	B/C	A		
MAC 02 652 ~	0.6	H6 CHONDRITE	B/C	A		
MAC 02 653 ~	0.2	H6 CHONDRITE	B/C	A		
MAC 02 654 ~	0.2	H6 CHONDRITE	B/C	A		
MAC 02 655 ~	0.6	H6 CHONDRITE	B/C	A		
MAC 02 656 ~	0.5	H5 CHONDRITE	B/C	A		
MAC 02 657 ~	0.5	H4 CHONDRITE	B/C	A		
MAC 02 658	1.3	CM2 CHONDRITE	B	B	0-52	
MAC 02 659 ~	1.0	LL5 CHONDRITE	B/C	A		
MAC 02 680 ~	10.5	LL5 CHONDRITE	A/B	A		
MAC 02 681 ~	3.8	H5 CHONDRITE	B/C	A		
MAC 02 682 ~	3.4	LL5 CHONDRITE	A/B	A		
MAC 02 683 ~	9.9	LL5 CHONDRITE	A/B	A		
MAC 02 684 ~	1.8	L5 CHONDRITE	A/B	A		
MAC 02 685 ~	2.4	H5 CHONDRITE	B	A/B		
MAC 02 686 ~	0.2	L5 CHONDRITE	B	A		
MAC 02 687 ~	14.1	H5 CHONDRITE	B/C	A/B		
MAC 02 688 ~	0.8	H5 CHONDRITE	B	A		
MAC 02 689 ~	0.1	L5 CHONDRITE	B	A		
MAC 02 690 ~	0.4	L6 CHONDRITE	C	A/B		
MAC 02 691 ~	2.1	H4 CHONDRITE	C	A/B		
MAC 02 692 ~	0.2	LL6 CHONDRITE	C	A/B		
MAC 02 693 ~	0.2	H5 CHONDRITE	C	A/B		
MAC 02 694 ~	0.1	H6 CHONDRITE	C	A/B		
MAC 02 695 ~	0.8	H6 CHONDRITE	C	A/B		
MAC 02 696 ~	0.3	H6 CHONDRITE	C	A/B		
MAC 02 698 ~	0.1	LL5 CHONDRITE	C	A/B		
MAC 02 699 ~	0.4	H6 CHONDRITE	C	A/B		
MAC 02 700 ~	10.7	H6 CHONDRITE	C	A		
MAC 02 701	10.1	CM2 CHONDRITE	BE	B	0-41	1-3
MAC 02 702 ~	4.5	H5 CHONDRITE	C	A/B		
MAC 02 704 ~	12.6	H5 CHONDRITE	C	A		
MAC 02 705 ~	58.0	H5 CHONDRITE	C	B		
MAC 02 706 ~	17.0	LL5 CHONDRITE	B/C	A/B		
MAC 02 707 ~	7.9	LL5 CHONDRITE	B/C	A/B		
MAC 02 708 ~	1.2	H5 CHONDRITE	B	A		
MAC 02 709 ~	0.3	LL6 CHONDRITE	B	A		
PCA 02 001 ~	354.0	L5 CHONDRITE	C	A/B		
PCA 02 002 ~	451.3	L5 CHONDRITE	C	C		
PCA 02 003 ~	308.6	H5 CHONDRITE	C	B		
PCA 02 004 ~	401.9	L5 CHONDRITE	B	A/B		
PCA 02 005 ~	220.5	L5 CHONDRITE	B	A/B		
PCA 02 006 ~	661.6	H5 CHONDRITE	C	C		
PCA 02 020 ~	78.0	LL5 CHONDRITE	A/B	A		
PCA 02 021 ~	74.6	LL6 CHONDRITE	A/B	A/B		
PCA 02 022 ~	34.7	LL5 CHONDRITE	A/B	A/B		
PCA 02 023 ~	67.1	LL6 CHONDRITE	A/B	A/B		
PCA 02 024 ~	44.8	LL5 CHONDRITE	A/B	A		
PCA 02 025 ~	79.0	H5 CHONDRITE	B	A		

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Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
PCA 02 026 ~	106.8	LL6 CHONDRITE	A/B	A		
PCA 02 027 ~	98.4	LL5 CHONDRITE	A/B	A		
PCA 02 028 ~	24.5	H5 CHONDRITE	B	A/B		
PCA 02 029 ~	10.4	L6 CHONDRITE	B/C	A/B		
PCA 02 030 ~	13.8	H5 CHONDRITE	B/C	A		
PCA 02 031 ~	3.7	H6 CHONDRITE	C	A		
PCA 02 032 ~	46.4	H5 CHONDRITE	C	A/B		
PCA 02 033 ~	34.6	L5 CHONDRITE	A/B	A		
PCA 02 034 ~	2.2	H5 CHONDRITE	C	A/B		
PCA 02 035 ~	29.1	L5 CHONDRITE	B/C	A/B		
PCA 02 036 ~	22.4	H5 CHONDRITE	B/C	A/B		
PCA 02 037 ~	8.8	LL5 CHONDRITE	B	A		
PCA 02 038 ~	1.7	H5 CHONDRITE	B/C	A		
PCA 02 039	9.4	H5 CHONDRITE	B	A	18	16
PCA 02 040 ~	15.9	H5 CHONDRITE	C	A/B		
PCA 02 041 ~	4.0	L5 CHONDRITE	B/C	A		
PCA 02 042 ~	14.4	LL6 CHONDRITE	B	A/B		
PCA 02 043 ~	9.2	LL5 CHONDRITE	B	B		
PCA 02 044	1.2	L4 CHONDRITE	A/B	A/B	25	21
PCA 02 045 ~	23.8	H5 CHONDRITE	C	A/B		
PCA 02 046 ~	25.5	H5 CHONDRITE	C	A		
PCA 02 047 ~	4.7	L5 CHONDRITE	C	A		
PCA 02 048 ~	4.0	L6 CHONDRITE	C	A		
PCA 02 049 ~	15.2	LL6 CHONDRITE	B	A/B		
PCA 02 050	9.8	CM2 CHONDRITE	B	A	0-40	
PCA 02 051 ~	20.8	H5 CHONDRITE	C	A/B		
PCA 02 052	43.4	H5 CHONDRITE	A/B	A/B	18	17
PCA 02 053 ~	33.9	LL5 CHONDRITE	B	A/B		
PCA 02 054 ~	2.2	H5 CHONDRITE	C	C		
PCA 02 055 ~	27.1	LL5 CHONDRITE	B	B		
PCA 02 056 ~	40.8	LL6 CHONDRITE	A/B	A		
PCA 02 057 ~	2.3	H6 CHONDRITE	C	C		
PCA 02 058 ~	6.6	L6 CHONDRITE	C	A		
PCA 02 059 ~	19.4	L5 CHONDRITE	B/C	A/B		
PCA 02 067 ~	4751.3	H5 CHONDRITE	C	C		
PCA 02 068 ~	640.1	LL6 CHONDRITE	B	B		
PCA 02 069 ~	244.2	LL6 CHONDRITE	A/B	A/B		
PCA 02 070	518.0	H5 CHONDRITE	A/B	A/B	18	16
PCA 02 071 ~	1175.0	L5 CHONDRITE	B/C	A/B		
PCA 02 072 ~	1021.9	LL6 CHONDRITE	B	B		
PCA 02 073 ~	259.6	LL5 CHONDRITE	A/B	A/B		
PCA 02 074 ~	147.0	LL5 CHONDRITE	A/B	A		
PCA 02 075 ~	224.8	L5 CHONDRITE	B/C	A/B		
PCA 02 076 ~	96.7	L5 CHONDRITE	B	A		
PCA 02 077 ~	113.9	LL6 CHONDRITE	B	A/B		
PCA 02 078 ~	25.6	LL5 CHONDRITE	B/C	A/B		
PCA 02 079 ~	3.0	H5 CHONDRITE	C	A/B		
PCA 02 080 ~	11.5	L6 CHONDRITE	C	A/B		
QUE 02 100 ~	1007.5	LL5 CHONDRITE	B	A/B		
QUE 02 101 ~	1.0	LL5 CHONDRITE	B	A		
QUE 02 102 ~	7.4	LL5 CHONDRITE	B	B/C		
QUE 02 103 ~	4.3	H5 CHONDRITE	C	B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 02 104 ~	9.9	H5 CHONDRITE	C	B		
QUE 02 105 ~	0.8	LL6 CHONDRITE	B	A		
QUE 02 106 ~	4.4	H6 CHONDRITE	C	B		
QUE 02 107 ~	18.0	H5 CHONDRITE	C	B		
QUE 02 108 ~	0.8	LL5 CHONDRITE	B	A		
QUE 02 109 ~	5.3	H5 CHONDRITE	C	A/B		
QUE 02 110 ~	136.6	H5 CHONDRITE	B/C	A		
QUE 02 111 ~	19.5	H5 CHONDRITE	B/C	A		
QUE 02 112 ~	12.1	LL4 CHONDRITE	A/B	A		
QUE 02 113 ~	6.4	H5 CHONDRITE	B/C	A		
QUE 02 114 ~	13.0	H5 CHONDRITE	B/C	A		
QUE 02 115 ~	9.0	H6 CHONDRITE	B/C	A		
QUE 02 116	4.6	H5 CHONDRITE	B/C	A	18	16
QUE 02 117 ~	4.7	L4 CHONDRITE	A/B	A		
QUE 02 118 ~	4.6	LL5 CHONDRITE	A/B	A		
QUE 02 119 ~	3.9	LL5 CHONDRITE	A/B	A		
QUE 02 120 ~	15.5	LL5 CHONDRITE	A/B	A/B		
QUE 02 121 ~	18.1	LL4 CHONDRITE	A/B	A		
QUE 02 122 ~	5.1	LL4 CHONDRITE	A/B	A		
QUE 02 123 ~	10.4	LL4 CHONDRITE	A/B	A		
QUE 02 124 ~	11.3	H6 CHONDRITE	B/C	A		
QUE 02 125 ~	17.2	LL4 CHONDRITE	A/B	A		
QUE 02 126 ~	3.8	LL5 CHONDRITE	A/B	A/B		
QUE 02 127 ~	5.4	LL4 CHONDRITE	B	A/B		
QUE 02 128 ~	4.8	LL4 CHONDRITE	A/B	A		
QUE 02 129	15.4	H4 CHONDRITE	B	A	18	16
QUE 02 130 ~	1.3	LL5 CHONDRITE	A/B	A		
QUE 02 131 ~	11.5	LL5 CHONDRITE	A/B	A		
QUE 02 132 ~	5.4	L5 CHONDRITE	B/C	A		
QUE 02 133 ~	12.8	H6 CHONDRITE	B/C	A		
QUE 02 134 ~	8.7	LL4 CHONDRITE	B	A		
QUE 02 135 ~	9.6	H6 CHONDRITE	B/C	A		
QUE 02 136 ~	1.8	H5 CHONDRITE	B/C	A/B		
QUE 02 137 ~	5.5	LL4 CHONDRITE	A/B	A/B		
QUE 02 138 ~	10.6	H5 CHONDRITE	B/C	A		
QUE 02 139 ~	1.3	LL5 CHONDRITE	A/B	A		
QUE 02 140 ~	14.8	H5 CHONDRITE	C	A		
QUE 02 141 ~	19.7	LL5 CHONDRITE	B	B		
QUE 02 142 ~	2.2	H5 CHONDRITE	C	B		
QUE 02 143 ~	7.9	H5 CHONDRITE	C	A/B		
QUE 02 144 ~	5.9	H5 CHONDRITE	C	A/B		
QUE 02 145 ~	0.8	L4 CHONDRITE	C	A/B		
QUE 02 146 ~	1.2	L6 CHONDRITE	C	A/B		
QUE 02 147 ~	4.6	L5 CHONDRITE	C	A/B		
QUE 02 148 ~	12.1	H6 CHONDRITE	C	A		
QUE 02 149 ~	1.3	LL5 CHONDRITE	C	C		
QUE 02 160 ~	286.6	LL5 CHONDRITE	A/B	A/B		
QUE 02 161 ~	91.4	L5 CHONDRITE	A/B	A		
QUE 02 162 ~	26.8	H5 CHONDRITE	B	A		
QUE 02 163 ~	122.6	H6 CHONDRITE	B/C	B		
QUE 02 164 ~	82.8	H5 CHONDRITE	B/C	A/B		
QUE 02 165 ~	51.0	H5 CHONDRITE	C	A/B		
QUE 02 166 ~	60.7	H5 CHONDRITE	B/C	A/B		

~Classified by using refractive indices.

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
QUE 02 167 ~	73.3	L5 CHONDRITE	B/C	A		
QUE 02 168 ~	50.6	H5 CHONDRITE	B/C	A		
QUE 02 169 ~	58.5	LL4 CHONDRITE	A/B	A		
QUE 02 170 ~	24.9	LL6 CHONDRITE	B/C	B		
QUE 02 171 ~	15.4	H5 CHONDRITE	C	A		
QUE 02 172 ~	11.5	L5 CHONDRITE	B/C	A		
QUE 02 173 ~	6.0	H5 CHONDRITE	C	B/C		
QUE 02 174 ~	5.9	H5 CHONDRITE	C	B/C		
QUE 02 175 ~	9.9	H5 CHONDRITE	C	B/C		
QUE 02 177 ~	1.9	LL5 CHONDRITE	B/C	B		
QUE 02 178 ~	0.6	LL5 CHONDRITE	B	B		
QUE 02 179 ~	3.2	L5 CHONDRITE	B	A		
QUE 02 180 ~	51.5	LL4 CHONDRITE	A/B	A		
QUE 02 181 ~	25.5	H5 CHONDRITE	B	A/B		
QUE 02 182 ~	29.1	H5 CHONDRITE	B	A		
QUE 02 183 ~	26.7	LL5 CHONDRITE	A/B	A		
QUE 02 184 ~	14.4	LL5 CHONDRITE	A/B	A		
QUE 02 185 ~	15.2	LL5 CHONDRITE	A/B	A		
QUE 02 186 ~	37.9	H5 CHONDRITE	B	A		
QUE 02 187 ~	9.7	L5 CHONDRITE	B	A/B		
QUE 02 188 ~	29.2	H5 CHONDRITE	B	A		
QUE 02 189 ~	27.1	LL4 CHONDRITE	A/B	A		
LAP 03 569	813.7	DIOGENITE	A	A	27	22
LAP 03 572	525.4	LL6 CHONDRITE	B	B/C	30	25
LAP 03 593	657.5	IRON (SULFIDE-RICH)	B	A		
LAP 03 605	582.8	IRON (SULFIDE-RICH)	B	A		
LAP 03 630	175.7	DIOGENITE	A	A		24
LAP 03 631	164.9	IRON (SULFIDE-RICH)	B	A		
LAP 03 632	92.6	LUNAR-BASALT	B	B	32-99	27-52
LAP 03 719	62.0	AUBRITE (ANOMALOUS)	B	B	0	0
LAP 03 780	21.8	AUBRITE	B/C	B		0
LAP 03 782	22.3	EUCRITE (UNBRECCIATED)	A/B	A		30-58
LAP 03 979	2.4	DIOGENITE (OLIVINE)	B	A/B	30	25
LAP 031269	12.9	AUBRITE	B	B		0
LAP 031372	17.6	AUBRITE	B	B		0
LAP 031381	1.9	DIOGENITE (OLIVINE)	B	A/B	30	25
MIL 03 346	715.2	NAKHLITE	B	B/C		21-49
MIL 03 356	443.5	IRON-IVA	A	A		
MIL 03 369	120.0	IRON-IIIC	A	A		

~Classified by using refractive indices.

TABLE 2
Newly Classified Specimens Listed By Type

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
		ACHONDRITES				
LAP 03 780	21.8	AUBRITE	B/C	B	0	
LAP 031269	12.9	AUBRITE	B	B	0	
LAP 031372	17.6	AUBRITE	B	B	0	
LAP 03 719	62.0	AUBRITE (ANOMALOUS)	B	B	0	0
LAP 03 569	813.7	DIOGENITE	A	A	27	22
LAP 03 630	175.7	DIOGENITE	A	A	24	
LAP 03 979	2.4	DIOGENITE (OLIVINE)	B	A/B	30	25
LAP 031381	1.9	DIOGENITE (OLIVINE)	B	A/B	30	25
LAP 03 782	22.3	EUCRITE (UNBRECCIATED)	A/B	A	30-58	
LAP 03 632	92.6	LUNAR-BASALT	B	B	32-99	27-52
MIL 03 346	715.2	NAKHLITE	B	B/C	21-49	
LAP 02 382	74.3	UREILITE	B	B	12-21	15-18
		CARBONACEOUS CHONDRITES				
LAP 02 277	7.8	CM1 CHONDRITE	A	A/B		
LAP 02 422	2.0	CM1 CHONDRITE	B	B		
LAP 02 269	24.2	CM2 CHONDRITE	B	B	0-27	
LAP 02 302	7.9	CM2 CHONDRITE	B/C	B	1-34	
LAP 02 308	14.1	CM2 CHONDRITE	B/C	B	0-7	1
LAP 02 336	85.6	CM2 CHONDRITE	B	B	0-42	
LAP 02 348	6.9	CM2 CHONDRITE	B	A	0-3	
LAP 02 349	26.0	CM2 CHONDRITE	B	B/C	0-45	
MAC 02 658	1.3	CM2 CHONDRITE	B	B	0-52	
MAC 02 701	10.1	CM2 CHONDRITE	BE	B	0-41	1-3
PCA 02 050	9.8	CM2 CHONDRITE	B	A	0-40	
LAP 02 342	42.4	CR2 CHONDRITE	A/B	A/B	0-5	1-3
MAC 02 528	5.6	CV3 CHONDRITE	A/B	A/B	0-3	0-3
		H CHONDRITE				
LAP 02 240	28.2	H CHONDRITE (IMPACT MELT)	C	A/B	18	16

Sample Number	Weight (g)	Classification	Weathering	Fracturing	% Fa	% Fs
E CHONDRITES						
MAC 02 556	1.4	E3 CHONDRITE	C	A	0-1	
IRONS						
MIL 03 369	120.0	IRON-IIIC	A	A		
MIL 03 356	443.5	IRON-IVA	A	A		
LAP 03 593	657.5	IRON (SULFIDE-RICH)	B	A		
LAP 03 605	582.8	IRON (SULFIDE-RICH)	B	A		
LAP 03 631	164.9	IRON (SULFIDE-RICH)	B	A		

**Notes to Tables 1 and 2:

"Weathering" Categories:

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

"Fracturing" Categories:

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

Table 3
Tentative Pairings for New Meteorites

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

AUBRITE

LAP 03780, LAP 031269 and LAP 031372 with LAP 02233

CM2 CHONDRITE

LAP 02302, LAP 02308 and LAP 02348 with LAP 02269
LAP 02349 with LAP 02336
PCA 02050 with PCA 02011

DIOGENITE

LAP 031381 with LAP 03979

IRON

LAP 03605 and LAP 03631 with LAP 03593

LUNAR BASALT

LAP 03632 with LAP 02205

Petrographic Descriptions

Sample No.: LAP 02235
Location: LaPaz Ice Field
Field No.: 15198
Dimensions (cm): 3.3 x 2.5 x 1.9
Weight (g): 31.108
Meteorite Type: L5 Chondrite

Macroscopic Description: Kathleen McBride
The exterior of this chondrite is covered with 90% black fusion crust with oxidation haloes and fractures. The interior is a dark gray to black matrix with rusty brown patches and some metal. Some millimeter sized inclusions are visible.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The meteorite is an equilibrated L chondrite (Fa_{23}, Fs_{20}) of petrologic type 5. It contains prominent shock veins of finely disseminated metal and sulfide that reach up to 3mm in width. No high pressure silicate polymorphs were noted.

Sample No.: LAP 02240
Location: LaPaz Ice Field
Field No.: 15167
Dimensions (cm): 3.9 x 2.5 x 2.5
Weight (g): 28.163
Meteorite Type: H Chondrite (Impact Melt)

Macroscopic Description: Cecilia Satterwhite
The exterior of this meteorite is brown. The interior revealed a brown matrix with no obvious features.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The section consists dominantly of a fine-grained melt-textured matrix of olivine and pyroxene (1-10 microns) with irregular blebs of metal with rimming sulfide and fragments of mineral grains (200-300 micron grain size.) The mineral compositions are homogenous; olivine is Fa_{18} and orthopyroxene is Fs_{16}. The meteorite is an impact melt of an H chondrite precursor.

Sample No.: LAP 02269; LAP 02302; LAP 02308; LAP 02348
Location: LaPaz Ice Field
Field No.: 15440; 15444; 15403; 15534
Dimensions (cm): 4.5 x 3.0 x 2.0; 3.0 x 2.0 x 1.5; 4.5 x 2.5 x 2.0; 2.0 x 2.0 x 1.5
Weight (g): 24.239; 7.859; 14.145; 6.862
Meteorite Type: CM2 Chondrite

Macroscopic Description: Kathleen McBride
These CM2 chondrites have purplish black fusion crust on the surface. The interior is a black matrix with millimeter sized inclusions of various colors including white, crème, gray and black.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The sections consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; sulfide and carbonate grains are present. Olivine compositions are Fa_{0-34}, with a peak at Fa_{0-2}, and orthopyroxene is Fs_{1}. The matrix consists dominantly of an Fe-rich serpentine; chondrules are relatively unaltered. The meteorites are CM2 chondrites.

Sample No.: LAP 02277
Location: LaPaz Ice Field
Field No.: 15432
Dimensions (cm): 2.5 x 2.0 x 1.5
Weight (g): 7.756
Meteorite Type: CM1 Chondrite

Macroscopic Description: Kathleen McBride
70% of the exterior is covered with rough purplish black fractured fusion crust. The interior of this carbonaceous chondrite has a black, chalky matrix with black to dark gray inclusions.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The section consists of a few small chondrules (up to 0.5 mm) that have been completely replaced by phyllosilicate set in an Fe-rich serpentine matrix. No isolated mineral grains or CAIs are apparent; sulfide and carbonate grains are present. Unaltered olivine or pyroxene grains of sufficient size for microprobe analyses were not found. The meteorite is a highly altered CM chondrite probably of petrologic type 1.

Sample No.: LAP 02336; LAP 02349
Location: LaPaz Ice Field
Field No.: 15528; 15519
Dimensions (cm): 5.0 x 4.0 x 3.0; 3.0 x 3.0 x 2.25
Weight (g): 85.563; 26.005
Meteorite Type: CM2 Chondrite

Macroscopic Description: Kathleen McBride
The exterior of 336 has a dull, brown-black fusion crust with polygonal fractures. A few areas have a shiny, frothy appearance. 349's exterior has a thick purplish patch of fusion crust. The interiors of both are dull, black, soft and friable with white, cream and tan colored chondrules. Both have an oxidation rind.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The sections consist of a few small chondrules (up to 0.5 mm), mineral grains and CAIs set in a black matrix; rare sulfide grains are present. Olivine compositions are Fa_{0-45}, with a peak at Fa_{0-2}. The matrix consists dominantly of an Fe-rich serpentine; chondrules are moderately altered. The meteorites are CM2 chondrites.

Sample No.: LAP 02342
Location: LaPaz Ice Field
Field No.: 15522
Dimensions (cm): 3.0 x 3.0 x 2.25
Weight (g): 42.418
Meteorite Type: CR2 Chondrite

Macroscopic Description: Kathleen McBride
100% of the exterior is covered with dull, brown/black fusion crust with oxidation haloes. The chocolate brown interior has millimeter sized multicolored chondrules.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The section exhibits large (up to 2mm), well-defined, metal-rich chondrules and CAI's in a dark matrix of FeO-rich phyllosilicate. Polysynthetically twinned pyroxene is abundant. Silicates are unequilibrated; olivines range from $Fa_{0-5,}$ and pyroxenes from Fs_{1-3}. The meteorite is probably a CR2 chondrite.

Sample No.: LAP 02382
Location: LaPaz Ice Field
Field No.: 15979
Dimensions (cm): 4.5 x 3.5 x 2.5
Weight (g): 74.318
Meteorite Type: Ureilite

Macroscopic Description: Kathleen McBride
90% of the exterior surface has thick black fusion crust. The interior has a black matrix with millimeter sized light colored inclusions.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
The section consists of an aggregate of small equant olivine and pyroxene grains up to 0.5 mm across. Individual olivine grains are rimmed by carbon-rich material containing traces of metal. Olivines have cores of Fa_{21}, with rims reduced to Fa_{12}. Pyroxene is pigeonite of $Fs_{18}Wo_{5}$. A single augite grain had a composition of $Fs_{15}Wo_{41}$. The meteorite is a ureilite.

Sample No.: LAP 02422
Location: LaPaz Ice Field
Field No.: 15985
Dimensions (cm): 1.5 x 1.0 x 1.25
Weight (g): 1.994
Meteorite Type: CM1 Chondrite

Macroscopic Description: Kathleen McBride
Small black patches of fusion crust are visible on the exterior surface. The interior is gray in color and is fine grained. The chondrules/clasts are dark gray in color.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The section consists of a few small chondrules (up to 0.5 mm) that have been completely replaced by phyllosilicate set in an Fe-rich serpentine matrix. No isolated mineral grains or CAIs are apparent; sulfide and carbonate grains are present. Unaltered olivine or pyroxene grains of sufficient size for microprobe analyses were not found. The meteorite is a highly altered CM chondrite probably of petrologic type 1.

Sample No.: MAC 02528
Location: MacAlpine Hills
Field No.: 14280
Dimensions (cm): 2.0 x 1.5 x 1.25
Weight (g): 5.607
Meteorite Type: CV3 Chondrite

Macroscopic Description: Kathleen McBride
Brown/black fusion crust covers the surface of this meteorite. The interior matrix is gray with low metal and light gray clasts.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
The section exhibits large chondrules (up to 3 mm) and CAIs in a dark matrix. Olivines range from Fa_{0-3} and pyroxenes from Fs_{0-3}. The meteorite is an unequilibrated carbonaceous chondrite, probably a CV3.

Sample No.: MAC 02556
Location: MacAlpine Hills
Field No.: 14280
Dimensions (cm): 0.75 x 1.00 x 0.5
Weight (g): 1.411
Meteorite Type: E3 Chondrite

Macroscopic Description: Kathleen McBride
The entire exterior is covered with shiny brown/black fusion crust. The interior has a rusty, crystalline surface texture with a high metal content.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The section shows an aggregate of small chondrules (up to 1 mm), abundant chondrule fragments, and pyroxene grains in a heavily weathered matrix. Several chondrules contain olivine. Microprobe analyses show the orthopyroxene is $Fs_{0-1.}$ The meteorite is an E3 chondrite. The complete weathering of metal makes the subtype (EH vs. EL) uncertain.

Sample No.: MAC 02658
Location: MacAlpine Hills
Field No.: 14146
Dimensions (cm): 2.0 x 1.0 x 0.75
Weight (g): 1.269
Meteorite Type: CM2 Chondrite

Macroscopic Description: Kathleen McBride
The exterior is black without fusion crust. The interior is a black matrix with tiny white inclusions.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
The section consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; sulfide and carbonate grains are present. Olivine compositions are Fa_{0-52}, with a peak at Fa_{0-1}. The matrix consists dominantly of an Fe-rich serpentine; chondrules are relatively unaltered. The meteorite is a CM2 chondrite.

Sample No.: MAC 02701
Location: MacAlpine Hills
Field No.: 14115
Dimensions (cm): 3.0 x 2.0 x 2.0
Weight (g): 10.112
Meteorite Type: CM2 Chondrite

Macroscopic Description: Kathleen McBride
75% of the exterior is covered with black fusion crust with polygonal fractures. The interior is a powdery black matrix with evaporites. Some sub mm light colored chondrules are visible.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
The section consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; sulfide and carbonate grains are present. Olivine compositions are Fa_{0-41}, with a peak at Fa_{0-1}, and orthopyroxene is Fs_{1-3}. The matrix consists dominantly of an Fe-rich serpentine; chondrules are relatively unaltered. The meteorite is a CM2 chondrite.

Sample No.: PCA 02050
Location: Pecora Escarpment
Field No.: 13633
Dimensions (cm): 3.0 x 1.5 x 1.5
Weight (g): 9.784
Meteorite Type: CM2 Chondrite

Macroscopic Description: Kathleen McBride
Thick, ropey, black fusion crust covers the surface of this carbonaceous chondrite. The black matrix has mm sized light colored chondrules.

Thin Section (,2) Description: Tim McCoy, Cari Corrigan
The section consists of a few small chondrules (up to 1 mm), mineral grains and CAIs set in a black matrix; rare metal and sulfide grains are present. Olivine compositions are Fa_{0-40}, with a peak at Fa_{0-2}. The matrix consists dominantly of an Fe-rich serpentine; chondrules are relatively unaltered. The meteorite is a CM2 chondrite and pairing with PCA 02011/02012 is likely.

Sample No.: LAP 03569
Location: LaPaz Ice Field
Field No.: 16919
Dimensions (cm): 10.5 x 8.0 x 7.0
Weight (g): 813.7
Meteorite Type: Diogenite

Macroscopic Description: Kathleen McBride
75% of the exterior is covered with chocolate brown fusion crust. The crust has a slight sheen with polygonal fractures. The exposed matrix is tan and has weathered, large green inclusions. The interior matrix is light gray with olive green angular inclusions.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
The section shows a groundmass of coarse (up to 3 mm) comminuted pyroxene, with lesser olivine. Orthopyroxene has a composition of $Fs_{22}Wo_2$ and an Fe/Mn ratio of ~28; olivine is Fa_{27}. The meteorite is a diogenite and is compositionally similar to LAP 91900 and LAP 02216. It could be paired with the latter, although it contains much more abundant olivine.

Sample No.: LAP 03593;
LAP 03605;
LAP 03631
Location: LaPaz Ice Field
Field No.: 16731; 16721; 16715
Dimensions (cm): 8.0 x 6.0 x 5.5;
9.5 x 5.5 x 4.5;
7.5 x 3.5 x 3.5
Weight (g): 657.5; 582.8; 164.9
Meteorite Type: Iron (Sulfide-rich)

Macroscopic Description: Tim McCoy, Lisa Collins
These meteorites exhibit a common external appearance. They have a knobby surface with numerous rounded protrusions up to 1 cm across intermixed with indentations containing a macroscopically jointed mineral.

Microscopic Description: Tim McCoy, Linda Welzenbach
These meteorites were examined from a cut surface of LAP 03593, which displays a sub equal mixture of metal and sulfide with trace amounts of schreibersite and silicates or graphite. The troilite occurs as irregular blobs up to 3 cm in length each of which is composed of multiple troilite crystals 3-5 mm across and exhibit prominent parallel jointing. The metal contains swathing kamacite rims typically 1 mm thick and short irregular bars of kamacite approximately < 0.5 mm. A heat altered α_2 structure extends up to 5 mm from the exterior weathered surface, and a highly altered fusion crust may be preserved in some places. The meteorites are similar to the IAB iron Pitts and the ungrouped iron Soroti, but exhibit coarser kamacite band widths than either, and lack the abundant silicates seen in Pitts.

Sample No.: LAP 03630
Location: LaPaz Ice Field
Field No.: 16049
Dimensions (cm): 5.5 x 4.0 x 3.5
Weight (g): 175.672
Meteorite Type: Diogenite

Macroscopic Description: Kathleen McBride
The exterior has small patches of chocolate brown crust (<10%) visible on the exterior. Areas without fusion crust show a tan matrix with green clasts visible. The interior matrix is light gray with olive green, angular inclusions.

Thin Section (,2) Description: Tim McCoy, Linda Welzenbach
The section is dominated by orthopyroxene, with individual grains reaching over 5 mm. The majority of the section consists of smaller (1 mm), equant grains which commonly intersect at 120°triple junctions. Orthopyroxene has a composition of $Fs_{24}Wo_2$ and an Fe/Mn ratio of ~28. The meteorite is a diogenite, although its texture is unusual.

Sample No.: LAP 03632
Location: LaPaz Ice Field
Field No.: 16823
Dimensions (cm): 5.5 x 3.5 x 3.0
Weight (g): 92.566
Meteorite Type: Lunar-Basalt

Macroscopic Description: Kathleen McBride

~75% of the exterior has shiny black fusion crust. The interior is pinkish-tan with white linear minerals and glass veins. This sample is paired with the LAP samples from the '02 season.

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

The section consists of a coarse-grained unbrecciated basalt with elongate pyroxene (up to 0.5 mm) and plagioclase laths (up to 1 mm) (~60:40 px:plag), rare phenocrysts of olivine (up to 1 mm) and interstitial oxides and late-stage mesostasis. Shock effects include undulatory extinction in pyroxene and shock melt veins and pockets. Microprobe analyses reveal pigeonite to augite of $Fs_{27-52}Wo_{12-33}$, plagioclase is $An_{87}Or_{0-1}$ and a single olivine phenocryst is Fa_{32-99}. The Fe/Mn ratio in the pyroxenes averages ~60. The meteorite is a lunar olivine-bearing basalt and is almost certainly paired with LAP 02205, LAP 02226, LAP 02224 and LAP 02436.

Sample No.: LAP 03719
Location: LaPaz Ice Field
Field No.: 16255
Dimensions (cm): 5.5 x 4.0 x 2.5
Weight (g): 62.021
Meteorite Type: Aubrite (Anomalous)

Macroscopic Description: Kathleen McBride

The exterior has 40% fusion crust, gray-brown in color. The interior is a white matrix with brown circular to oval shaped inclusions. The matrix is stained brown and has lots of rust/weathering.

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

The section is an unbrecciated rock consisting of essentially FeO-free enstatite, diopside and olivine with minor metal, troilite, daubreelite and alabandite. Enstatites reach 1 cm in maximum dimension and contacts between enstatite grains are often interfingering. Blebby diopside exsolution occurs within enstatite and at enstatite-enstatite grain boundaries. Olivine, which occupies ~20% of the section, reaches 3 mm. Although the pyroxene textures are reminiscent of some aubrite clasts, the unbrecciated nature, texture and olivine abundance in this aubrite are unique.

Sample No.: LAP 03780; LAP 031269; LAP 031372
Location: LaPaz Ice Field
Field No.: 16745; 16191; 16719
Dimensions (cm): 3.5 x 2.5 x 2.0; 2.5 x 2.5 x 2.0; 3.0 x 2.0 x 2.5
Weight (g): 21.807; 12.930; 17.613
Meteorite Type: Aubrite

Macroscopic Description: Kathleen McBride

The exteriors are white without any fusion crust. The interiors are white matrix with brown circular to oval shaped inclusions.

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

The sections consist of an aggregate of coarse (up to 5 mm), heavily shocked enstatite grains with minor to trace abundances of diopside, metal, troilite, alabandite, and daubreelite. Silicates are essentially FeO-free enstatite (Fs_0Wo_1) and diopside (Fs_0Wo_{43}). The meteorites are aubrites and may be paired with LAP 02233. They were found over a range of 1.5 km.

Sample No.: LAP 03782
Location: LaPaz Ice Field
Field No.: 16082
Dimensions (cm): 2.5 x 2.5 x 1.75
Weight (g): 22.269
Meteorite Type: Eucrite (Unbrecciated)

Macroscopic Description: Kathleen McBride

The exterior of this eucrite has about 40% thin, black, shiny fusion crust. The interior has a dense crystalline matrix with minor rust and is very hard.

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

This meteorite exhibits a granoblastic texture, with pyroxenes reaching 1.5 mm and plagioclase 1.0 mm, although most grains are smaller. Pyroxenes are exsolved on the scale of 1-20 microns, with orthopyroxene ($Fs_{58}Wo_4$), with lamellae of augite ($Fs_{30}Wo_{37}$), and plagioclase ($An_{90}Or_{0.2}$). The Fe/Mn ratio of the pyroxene is ~30. Staining by hydrated iron oxides is pervasive. The meteorite is an unbrecciated eucrite.

Sample No.: LAP 03979; LAP 031381
Location: LaPaz Ice Field
Field No.: 16489; 16628
Dimensions (cm): 1.5 x 1.25 x 0.75; 1.5 x 1.25 x 0.75
Weight (g): 2.406; 1.890
Meteorite Type: Diogenite (Olivine)

Macroscopic Description: Kathleen McBride

95% of the exterior is covered with brown/black fusion crust with small shiny patches. The rusty, granular interior has mm sized black inclusions and green mineral grains that are up to 2 mm in size.

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

These two small sections are unbrecciated rocks dominated by orthopyroxene ($Fs_{25}Wo_3$), olivine (Fa_{30}) and plagioclase ($An_{80\text{-}85}Or_1$). Most grains are less than 0.5 mm in diameter, although a single pyroxene in 031381 reaches 4 mm. The meteorites are unbrecciated olivine diogenites.

Sample No.: MIL 03346
Location: Miller Range
Field No.: 13205
Dimensions (cm): 10.0 x 6.0 x 5.5
Weight (g): 715.200
Meteorite Type: Nakhlite

Macroscopic Description: Kathleen McBride

60% of the exterior is covered with black "wrinkled" appearing fusion crust. The areas without fusion crust are a black crystalline material with vugs. The binocular microscopic view of the exterior surface appears melted or fused together. The interior reveals a coarse grained, dark green to blackish crystalline matrix with a granular texture. This nakhlite is unbrecciated and homogeneous with interlocking grains and minor rust.

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

The section is dominated by lathy to equant clinopyroxene that reaches 2 mm in maximum dimension. Mesostasis occupies approximately 20% of the rock and contains skeletal iron-titanium oxides. Clinopyroxenes have core compositions of Fs_{21} Wo_{40} with rims reaching Fs_{49} $Wo_{34.}$ Olivine was not observed. The meteorite is a nakhlite. Its pyroxenes are compositionally similar to Lafayette, but it is richer in mesostasis and unusual for nakhlites in lacking olivine.

Sample No.: MIL 03356
Location: Miller Range
Field No.: 13970
Dimensions (cm): 7.5 x 4.5 x 3.0
Weight (g): 443.5
Meteorite Type: Iron-IVA

Macroscopic Description: Tim McCoy, Lisa Collins

This slipper-shaped meteorite has a smooth exterior surface partially (30-50%) covered by fusion crust which exhibits prominent flow lines. Prominent fracturing, which follows the Widmanstätten structure, extends to the interior along the end opposite the nose. An interesting feature is the presence of two holes, about 1 mm in diameter and of depth equal to or greater than the diameter, one of which contains a single euhedral metal crystal.

Microscopic Description: Tim McCoy, Linda Welzenbach

The meteorite was examined from a cut and etched surface, which bisected the larger end or nose of the specimen. The surface exhibits prominent kamacite lamellae (L/W ~20) with bandwidths less than 0.2-0.3 mm set in approximately 40-50% plessite fields. Rare, very small troilite inclusions, up to 1mm are present. An elongate needle, 2.5 mm long, of chromite(?) is also present. The meteorite appears to have been extensively shocked and exhibits α_2 structure throughout the meteorite and prominent Neumann bands in many of the kamacite lamellae. A thin fusion crust is preserved over much of the surface, and a heat altered zone approximately 0.5 mm thick underlies that fusion crust. The meteorite is similar to the IVA iron Duchesne.

Sample No.:	MIL 03369
Location:	Miller Range
Field No.:	13972
Dimensions (cm):	5.0 x 2.5 x 2.0
Weight (g):	119.963
Meteorite Type:	Iron-IIIC

Macroscopic Description: Tim McCoy, Lisa Collins

This lozenge-shaped meteorite has a rounded exterior peppered with 3mm rust halos, and has a single comma shaped indentation. Most of the surface is relatively smooth, while the bottom face shows a subtle relief of the Widmanstätten pattern.

Microscopic Description: Tim McCoy, Linda Welzenbach

The meteorite was examined from a cut and etched surface, which bisects the long axis of the specimen. The cut surface exhibits prominent skeletal kamacite lamellae (L/W ~50) with bandwidths less than 0.2-0.5 mm set in approximately 40-50% plessite fields of both comb (~10%) and martensite (30-40%). The kamacite typically contain minute lathes of schreibersite crystals arrayed along the central long axis. The meteorite exhibits α_2 structure throughout the prominent fissures in many of the kamacite lamellae. A thin fusion crust is preserved over some parts, and a heat altered zone approximately 0.5 mm thick underlies that fusion crust. The meteorite is similar to the IIIC iron Carlton, although appears to be more shock altered than Carlton.

Sample Request Guidelines

Requests for samples are welcomed from research scientists of all countries, regardless of their current state of funding for meteorite studies. Graduate student requests should have a supervising scientist listed to confirm access to facilities for analysis. All sample requests will be reviewed in a timely manner. For sample requests that do not meet the curatorial guidelines the Meteorite Working Group (MWG) will review those requests. 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 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 July 2003) have been published in the Meteoritical Bulletins 76, 79, and 82-88, available in the following volumes and pages of *Meteoritics* and *Meteoritics and Planetary Science*: 29, p. 100-143; 31, A161-A174; 33, A221-A240; 34, A169-A186; 35, A199-A225; 36, A293-A322; 37, A157-A184; 38, p. A189-A248, 39, in press. They are also available online at:

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

The most current listing is found online at:

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

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

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

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

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

cecilia.e.satterwhite1@jsc.nasa.gov

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

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

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

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

Requests that are received by the MWG secretary by **September 03, 2004** deadline will be reviewed at the MWG meeting **September 23-24, 2004** in Houston, TX. Requests that are received after the deadline may be delayed for review until MWG meets again in the Spring of 2005. **Please submit your requests on time.** Questions pertaining to sample requests can be directed to the MWG secretary by e-mail, fax or phone.

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Meteorites On-Line

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

JSC Curator, Antarctic meteorites	http://www-curator.jsc.nasa.gov/curator/antmet/antmet.htm
JSC Curator, martian meteorites	http://www-curator.jsc.nasa.gov/curator/antmet/marsmets/contents.htm
JSC Curator, Mars Meteorite Compendium	http://www-curator.jsc.nasa.gov/curator/antmet/mmc/mmc.htm
Antarctic collection	http://geology.cwru.edu/~ansmet/
LPI martian meteorites	http://www.lpi.usra.edu
NIPR Antarctic meteorites	http://www.nipr.ac.jp/
BMNH general meteorites	http://www.nhm.ac.uk/mineralogy/collections/meteor.htm
UHI planetary science discoveries	http://www.psrd.hawaii.edu/index.html
Meteoritical Society	http://www.meteoriticalsociety.org/
Meteoritics and Planetary Science	http://meteoritics.org/
Meteorite! Magazine	http://www.meteor.co.nz
Geochemical Society	http://www.geochemsoc.org
Washington Univ. Lunar Meteorite	http://epsc.wustl.edu/admin/resources/moon_meteorites.html
Washington Univ. "meteor-wrong"	http://epsc.wustl.edu/admin/resources/meteorites/meteorwrongs/meteorwrongs.htm

Other Websites of Interest

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