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National Institute of Polar Research (NIPR), Japan
&
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Meteorite Newsletter, Vol 23

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Introduction

This newsletter reports the classification of part of meteorites collected from ice fields near the Sør Rondane Mountains by three Japan-Belgium expeditions consisting of the first joint mission (JARE 51) in the Balchen Ice Field in the eastern Sør Rondane Mountains region (2009-2010), the second joint BELARE-SAMBA (2010-2011) in the north-west part of the Nancen Ice Field, and the third mission (JARE 54 – BELARE-SAMBA) (2012-2013) in the south part of the Nancen Ice Field. The collected meteorites are shared by the National Institute of Polar Research, in Tokyo and Royal Belgian Institute of Natural Sciences, in Brussels. This newsletter includes 437 meteorite names including six carbonaceous chondrites (3 CM, 1 CK chondrite, 1 CO, 1 CM), and 1 diogenite, 1 mesosiderite, and 1 winonite. Also, it contains 11 regolith breccias of LL chondrites.

Classification

Classification was made with visual inspection of meteorites and petrographic observations of polished thin sections as well as compositions of major minerals (olivine, pyroxene, and plagioclase) obtained by an electron microprobe (JEOL JSM 8800 at NIPR). Typical numbers of olivine analysis for ordinary chondrites are ~20-30. Table 1 presents the results of classifications (groups, averages and ranges of Fs and Fa values, fracturing and weathering degrees). Figure 1 presents descriptions and photomicrographs of selected meteorites. Macroscopic descriptions were made by T. Tomimura and H. Kojima.

Sample requests

We welcome collaborations using the Antarctic meteorites from research scientists from all over the world. All sample requests will be reviewed in a timely manner by curators and scientific members at NIPR, RBINS, VUB, and Université Libre de Bruxelles (ULB).

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Table 1. List of meteorites classified in this volume.

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09001	H4	1.012	17.7	17.2-18.5	15.9	14.8-17.1	C	A/B	
A09002	H4	1.709	17.6	16.8-18.2	15.7	14.5-16.8	C	A	
A09004	H5	2.187	18.7	17.8-20.6	16.4	15.0-17.1	C	A/B	
A09005	H6	1.383	19.5	18.6-20.5	17.3	16.5-18.0	B/C	A	
A09006	H6	1.251	19.3	18.7-20.1	17.1	15.9-17.6	C	B	
A09007	H6	11.760	19.8	18.3-21.5	17.5	16.4-19.4	B	B	
A09008	H6	7.063	19.6	18.8-21.0	17.0	16.1-18.0	B/C	B	
A09009	H6	5.237	19.3	18.6-20.4	17.1	16.2-19.4	B/C	B	
A09010	H6	6.453	19.4	18.2-21.0	17.0	16.5-17.5	B/C	B	
A09011	H6	2.545	19.3	18.3-20.8	16.9	16.2-17.4	C	A/B	
A09012	H6	4.190	19.4	18.3-20.4	16.8	15.1-17.6	C	B	
A09013	H6	2.893	19.6	18.6-21.1	17.3	16.7-18.0	C	A/B	
A09014	H6	2.199	19.5	18.7-20.5	17.0	16.3-18.4	C	B	
A09015	H6	3.450	19.6	18.2-20.4	17.0	15.9-18.6	C	B/C	
A09016	H6	2.575	19.7	18.7-20.9	16.9	16-17.5	B/C	B	
A09017	H6	2.458	19.6	18.7-20.7	17.3	16.6-21.9	C	B	
A09018	H6	1.953	19.7	18.9-22.2	17.0	15.7-18.2	C	B	
A09019	L3	2.139	16.9	0.3-42.1	10.3	0.7-22.1	B	B	
A09020	H6	1.399	19.7	18.4-20.5	17.4	16.5-19.9	C	A/B	
A09021	H6	1.437	19.7	18.4-21.7	16.9	15.7-18.2	B/C	A/B	
A09022	H6	1.080	19.6	18.6-20.5	17.3	15.9-19.4	C	A/B	
A09023	H6	1.692	19.8	18.1-26.8	17.4	16.8-18.0	B/C	A/B	
A09024	H6	1.111	19.7	18.9-20.6	17.4	16.6-17.9	C	B	
A09025	H6	1.414	19.6	18.7-21.3	17.4	16.7-19.7	B/C	B	
A09026	H6	1.878	19.7	18.6-22.9	17.1	15.7-18.0	B/C	B	
A09027	H6	1.008	19.6	18.6-20.6	17.3	15.6-20.0	B/C	A	
A09028	H6	1.240	19.6	18.8-21.9	17.2	16.2-18.4	B/C	A/B	
A09029	H6	1.425	19.7	18.9-22.5	17.2	16.4-17.8	B	A/B	
A09030	H6	1.025	19.6	18.6-20.9	17.0	16.2-17.7	C	B	
A09031	H6	0.892	19.8	18.4-23.1	17.1	16.4-17.9	B/C	A/B	
A09032	H6	1.049	19.9	18.5-22.8	17.1	15.5-18.3	B/C	A/B	
A09033	H6	1.021	19.6	18.3-20.4	17.2	15.5-18.3	B	B	
A09034	H6	0.750	20.0	18.6-23.6	17.4	16.0-18.7	B/C	A/B	
A09035	H6	0.545	19.9	19.0-22.0	17.2	16.0-19.2	B/C	A	
A09036	LL3	0.876	12.5	1.3-32.2	9.4	1.5-23.6	A	A/B	
A09037	LL3	0.762	17.6	0.4-45.0	11.6	1.1-27.6	A	A	
A09038	H6	0.830	19.8	19.0-22.2	17.4	16.2-20.4	B/C	A	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09039	H6	0.795	19.7	18.4-21.6	17.2	16.7-17.7	B/C	B	
A09040	H6	0.723	19.9	19.3-23.2	17.1	15.3-18.2	C	A/B	
A09041	H6	0.640	19.5	18.6-21.4	17.1	14.7-18.3	B	A/B	
A09042	H6	0.628	19.7	18.4-22.6	17.0	15.4-17.7	B/C	B	
A09043	H6	0.650	19.5	17.8-20.3	17.2	16.0-17.9	C	A/B	
A09044	LL3	0.543	13.0	0.4-35.4	12.0	2.0-31.5	B	B	
A09045	L3	0.579	13.1	0.5-34.4	15.9	1.8-34.5	B	A	
A09046	H6	0.445	19.5	18.4-21.1	17.2	16.5-17.7	C	A	
A09047	H6	0.605	19.7	18.2-23.7	17.2	16.0-19.2	B/C	A/B	
A09048	H6	0.570	19.6	18.3-21.2	17.0	16.1-17.9	C	A	
A09049	H6	0.495	19.7	18.5-22.7	17.1	15.1-19.7	B/C	A	
A09050	H6	0.762	17.0	15.8-19.4	14.8	13.8-16.9	C	B	
A09051	H6	0.582	16.8	15.5-18.0	14.75	13.8-18.4	C	A/B	
A09052	H6	0.578	17.1	15.8-18.5	14.58	13.2-15.8	B/C	A	
A09053	H6	0.567	16.7	15.7-17.7	14.62	14.1-17.1	B	A/B	
A09054	LL3	0.382	17.5	7.5-32.7	17.96	4.2-27.6	B/C	A	
A09055	H6	0.453	16.8	15.6-18.7	14.55	13.6-15.2	C	A	
A09056	H6	0.322	17.3	15.8-20.8	14.48	13.8-15.8	B/C	A/B	
A09057	H6	0.648	17.0	15.7-19.9	14.5	13.7-15.2	B	B	
A09058	H6	0.575	16.9	15.8-18.4	14.53	13.7-16	B/C	A/B	
A09059	H6	0.417	17.3	16.1-23.0	14.47	13.4-15.7	B/C	A/B	
A09062	H6	0.494	17.0	16.3-19.0	14.87	14.1-18.2	C	A/B	
A09067	H6	0.323	17.1	16.3-18.7	14.65	14-17.3	B	A/B	
A09132	LL3	1.714	16.4	1.0-42.7	12.37	0.8-40.8	B	A/B	
A09133	LL3	2.101	14.0	1.4-29.5	14.19	2.1-35.8	B	A/B	
A09134	LL3	1.239	14.6	1.2-30.6	11.61	1.5-29.7	B	B	
A09135	LL3	146.05	13.3	0.7-27.8	15.3	0.9-35.2	B	B	
A09136	H6	15.784	19.7	18.5-20.8	17.34	16.5-18.8	C	B	
A09137	LL3	4.588	17.4	1.6-39.3	11.3	1.0-24.3	C	A/B	
A09138	LL3	3.973	15.1	0.8-26.2	9.7	1.5-24.1	B	A	
A09139	LL3	3.296	12.9	0.7-21.8	9.6	1.0-31.2	B	A/B	
A09140	LL3	2.995	17.8	0.7-32.0	9.8	0.9-32.8	B	A/B	
A09141	LL3	2.595	16.8	0.8-35.8	10.2	1.5-21.1	B	A/B	
A09142	LL3	2.734	15.6	0.4-30.8	14.7	1.4-34.0	B	A/B	
A09143	LL3	2.109	13.0	4.7-22.3	15.1	4.2-24.7	B	A/B	
A09144	LL3	1.707	14.8	1.6-34.1	8.1	2.1-19.6	B/C	A	
A09145	LL3	1.578	14.4	4.5-25.0	11.4	4.1-25.1	B/C	A	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09146	LL3	1.502	15.5	8.3-22.4	13.1	2.0-21.2	B	A	
A09147	LL3	1.621	14.6	6.9-23.5	13.2	4.1-25.5	B/C	A	
A09148	LL3	1.068	15.9	0.7-28.2	8.7	2.0-30.8	B/C	A/B	
A09150	LL3	1.038	12.8	0.8-30.2	9.6	2.5-22.5	B/C	A/B	
A09151	LL3	1.164	13.7	6.3-24.3	14.7	3.8-30.2	C	A/B	
A09152	LL3	0.953	13.9	2.0-29.4	17.5	12.3-25.7	B	A	
A09153	LL3	0.873	15.5	0.8-30.5	7.5	0.6-23.7	B	A	
A09154	LL3	1.000	11.4	0.5-22.0	11.2	0.9-27.4	B	A/B	
A09155	LL3	0.698	13.8	0.3-22.5	16.6	2.6-41.7	B/C	A	
A09156	H6	0.752	17.1	15.9-19.4	15.0	14.3-17.0	C	A/B	
A09157	LL3	0.703	11.3	0.9-33.0	9.5	1.4-30.9	B	A	
A09158	LL3	0.531	16.1	0.8-39.1	11.5	2.3-31.7	B	A	
A09159	LL3	0.976	16.1	8.5-32.2	12.2	0.8-41.9	B	A	
A09160	LL3	0.683	13.5	0.3-36.9	9.0	0.8-23.1	B/C	A	
A09161	LL3	0.537	13.4	0.3-26.5	7.0	0.6-27.1	B	A	
A09162	LL3	0.564	17.6	3.9-37.6	10.1	1.2-23.0	B	A	
A09163	LL3	0.350	14.9	1.5-23.4	10.9	3.0-29.2	C	A	
A09164	LL3	0.698	17.2	3.4-30.3	14.6	1.4-39.0	B	A/B	
A09165	H6	0.406	19.4	17.9-20.1	16.7	15.1-18	B/C	A	
A09166	LL3	0.423	20.9	5.3-34.8	8.3	2.3-16.1	B/C	A/B	
A09167	LL3	0.413	18.4	6.7-32.3	10.0	2.2-31.1	B/C	A/B	
A09168	LL3	0.538	16.5	6.9-24.2	13.5	2.5-34.6	B/C	A	
A09169	LL3	0.348	18.5	0.5-35.6	8.7	0.9-26.9	B/C	A/B	
A09170	LL3	0.339	15.3	0.3-32.6	10.2	2.0-28.6	C	A	
A09175	H6	1.403	18.7	17.4-20.2	16.4	14.8-17.6	B	A/B	
A09177	LL3	1.558	24.7	13.4-28.7	16.2	8.1-26.2	B/C	A	
A09178	LL3	9.179	16.8	1.2-35.0	11.6	3.2-28.7	B/C	A/B	
A09180	H6	1.626	19.6	18.2-21.3	17.0	16.4-17.9	C	A	
A09181	H6	1.187	19.5	17.8-21.9	17.0	16.0-18.2	C	A/B	
A09182	LL3	4.715	24.8	23.5-27.6	19.1	6.0-28.6	B	A/B	
A09183	H5	17.558	18.8	17.7-19.6	16.5	15.3-17.3	C	A/B	
A09188	H6	0.311	19.3	17.8-20.2	16.9	15.3-17.6	C	A	
A09189	H6	0.871	19.7	17.9-21.8	17.0	16.5-18.6	C	B	
A09190	LL3	1.465	24.3	18.3-25.8	16.3	9.0-33.2	B	A	
A09193	H6	4.198	19.7	18.3-20.7	17.2	15.6-18.8	B/C	A/B	
A09195	H5	2.813	18.8	17.9-20.6	16.8	15.7-18.3	C	A/B	
A09196	L6	2.757	25.2	23.6-26.5	22.6	21.0-24.2	A/B	B	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09197	LL3-6	0.946	28.8	22.0-33.2	22.9	9.5-26.8	A/B	A	Genomict breccia
A09198	H5	2.468	19.0	17.5-20.9	16.6	15.6-17.5	B/C	A	
A09199	L6	2.941	25.0	23.4-28.5	21.1	19.8-23.2	B/C	B	
A09235	H5	5.740	18.7	18.1-19.6	16.7	15.5-18.4	B	A	
A09239	L6	5.640	25.5	19.7-28.6	20.8	19.5-21.9	B	A	Maskelynite, shock vein
A09240	H4	6.058	18.9	17.7-23.1	16.4	15.3-17.9	B	B	
A09241	H5	5.858	18.7	17.9-20.1	16.8	14.8-21.6	B	A/B	
A09244	L6	286.45	25.6	24.4-26.5	21.1	20.3-21.8	B	A/B	
A09245	H5	10.230	19.2	18.1-20.6	16.7	15.9-17.2	B/C	A	
A09249	L6	64.82	25.2	24.3-26.2	21.7	20.9-23.4	B	A	
A09255	H5	15.471	18.6	17.4-19.9	16.4	15.3-18.7	B	A	
A09268	L6	27.817	25.2	23.8-27.2	21.1	20.5-22.0	B/C	A	
A09269	L6	7.037	25.0	23.2-26.3	21.3	20.3-24.0	B	A	
A09272	LL3	27.633	20.4	1.7-44.1	11.0	2.0-35.7	B/C	A	
A09273	H5	7.813	17.5	16.3-19.1	16.1	15.0-19.2	B	A	Shock vein
A09274	H5	6.673	18.1	16.3-29.7	16.0	14.5-17.5	B	A	
A09317	Ure	208.09	8.2	1.0-20.9			-	A/B	
A09318	Ure	9.025	6.9	1.1-22.1			-	B/C	
A09323	H5	53.396	17.8	16.5-19.8	16.0	15.1-17.2	C	A	
A09328	L6	52.274	25.3	23.7-27.6	21.9	20.8-24.2	B	A	Maskelynite, shock vein
A09329	H6	45.763	19.7	17.8-21.9	17.5	15.8-20.3	C	A	Shock vein
A09343	L6	8.331	25.3	24.0-27.9	21.5	19.9-24.1	A	A	Maskelynite
A09349	H5	20.907	18.9	17.9-20.1	16.5	15.5-18.4	B/C	B	Shock vein
A09350	H6	15.852	19.0	17.9-21.1	17.1	15.7-21.4	A	A/B	
A09351	H6	9.034	19.7	18.6-20.9	17.0	15.5-18.8	B	A/B	
A09352	H5	10.811	19.2	17.8-22.2	17.0	14.5-19.3	B/C	A/B	
A09368	Ure	6.189	14.7	3.5-21.3	15.8	15.4-16.2	-	A	
A09370	H6	11.423	20.5	18.1-24.4	18.3	16.8-21.9	B	A	Monomict breccia
A09371	L6	10.814	25.3	22.8-28.0	21.5	20.1-23.9	C	A/B	Maskelynite, shock vein
A09373	H5	18.282	19.1	17.8-20.6	17.3	15.8-22.0	B	A	
A09374	H6	18.182	20.0	19.1-20.8	17.2	14.9-18.6	C	A	
A09375	L6	8.034	24.9	16.2-26.9	21.6	20.5-23.1	A/B	B	Maskelynite, shock vein
A09379	L6	6.262	24.6	23.2-25.5	21.9	20.3-24.8	A	A	Maskelynite
A09380	L6	42.517	25.2	23.4-27.8	21.1	20.0-21.9	B	A/B	Maskelynite, shock vein
A09382	H5	6.840	19.0	18.3-20.5	16.7	15.2-20.3	C	A/B	
A09387	H4	170.58	18.9	17.2-22.0	16.4	15.6-17.7	B/C	B	
A09388	H5	12.989	19.3	3.7-21.4	16.8	15.8-17.7	B	A/B	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09389	H5	9.027	19.7	16.7-22.4	17.1	13.4-20.3	B	A/B	
A09408	H5	22.765	18.4	17.2-19.4	16.4	14.5-18.9	B/C	B	
A09409	L6	211.34	24.9	23.1-26.8	21.2	20.5-24.6	A	A/B	Maskelynite
A09412	H6	7.084	18.3	16.7-19.3	16.3	15.0-19.1	C	A	
A09413	L5	46.458	25.3	23.6-26.1	21.2	20.3-22.5	C	A/B	
A09414	L3	53.761	25.8	11.9-28.1	19.2	12.5-25.0	B	A	
A09426	LL3	6.560	14.8	1.5-27.1	10.5	0.8-24.6	C	A	
A09427	H4	31.524	17.9	16.4-20.6	15.6	14.7-16.5	B	A	
A09428	H5	13.540	19.2	17.8-20.9	17.2	15.3-20.7	B	A/B	
A09431	L6	201.98	25.2	23.8-28.7	21.5	19.4-24.6	B	B	Maskelynite
A09432	L6	11.960	25.3	20.7-28.3	21.4	19.3-23.1	B/C	A	Maskelynite, shock vein
A09433	L6	7.878	25.1	21.2-26.9	21.7	20.3-25.8	B	A/B	Shock vein
A09436	H3	289.13	17.7	16.3-19.4	15.8	10.4-18.4	C	A/B	
A09439	H6	8.550	20.4	19.6-22.1	17.8	16.4-20.3	B/C	A	
A09441	L6	7.727	25.3	24.1-27.0	21.7	19.7-24.2	B	A	Maskelynite, shock vein
A09442	L6	130.95	25.4	23.9-26.8	21.4	19.1-23.3	B	A/B	Maskelynite
A09443	L6	34.261	25.4	23.2-27.0	22.0	19.8-24.8	B	A/B	Maskelynite
A09445	L6	37.759	24.7	21.4-25.9	20.7	19.6-21.3	B	A	Maskelynite, shock vein
A09446	L6	13.790	25.3	24.3-26.8	21.9	20.3-24.4	B	A	Shock vein
A09447	H4	7.471	17.7	15.7-19.7	16.4	14.6-22.7	B	A	
A09448	H5	12.242	18.0	16.2-20.4	16.2	13.7-19.0	B	A	
A09453	L6	49.120	24.8	22.2-27.1	21.5	19.7-23.5	B/C	A/B	Maskelynite, shock vein
A09455	L6	4953.00	25.3	23.6-26.9	21.2	20.1-23.4	B/C	B	Maskelynite
A09456	L6	57.129	25.7	24.2-28.2	22.1	20.9-25.5	C	B	Maskelynite
A09457	L6	14.389	25.9	24.6-27.9	22.4	19.9-25.8	C	B	Maskelynite
A09468	L6	176.28	25.5	23.8-29.4	21.6	20.4-24.2	C	A/B	Maskelynite
A09469	L6	11.831	25.3	24.3-26.8	21.3	20.7-22.8	C	A	Maskelynite
A09473	H3	6.770	16.7	16.1-17.9	16.3	13.2-21.2	B/C	A	
A09474	CM	119.18	23.3	8.1-37.3	21.0	17.4-22.9	-	A/B	Highly altered
A09481	H6	9.483	20.1	18.6-22.6	17.9	16.2-22.4	C	A	
A09482	H5	8.275	19.9	17.7-20.8	17.3	15.9-18.3	B/C	A/B	
A09488	L6	170.46	25.2	23.7-29.5	22.0	20.8-25.5	B/C	A/B	
A09502	H5	6.235	18.9	17.9-20.8	16.6	15.2-20.5	B	B	
A09507	H6	13.762	20.2	19.2-22.7	17.7	16.5-19.6	C	A/B	
A09508	L6	31.301	25.0	23.5-27.8	20.7	20.0-21.4	C	B	
A09515	L6	738.00	25.3	24.1-26.9	20.9	19.8-21.9	A/B	A/B	
A09516	H6	166.20	19.0	18.5-19.7	16.5	15.3-17.4	C	B	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09523	H5	67.95	19.6	18.5-23.6	16.8	15.5-19.9	C	B	
A09524	H5	33.744	18.8	17.2-22.7	16.0	15.0-16.5	B/C	B	
A09528	H3	33.511	13.2	0.3-28.1	8.6	1.7-21.4	B	B/C	
A09530	H4	20.859	19.0	17.1-20.3	17.5	15.6-25.1	C	A	
A09531	H5	6.376	19.1	17.7-20.6	16.8	15.7-19.4	A	A	
A09532	L3	37.325	25.7	22.0-27.5	18.3	11.6-26.9	C	A	
A09533	L3	55.419	26.2	23.4-28.9	17.7	12.1-23.6	B	A	
A09534	L3	23.059	25.9	12.1-28.4	20.0	9.9-24.4	A/B	A/B	
A09537	H6	104.42	18.5	17.1-21.6	16.4	15.2-17.5	C	B	
A09540	H5	88.12	18.4	17.3-19.4	16.4	14.0-17.4	C	A/B	
A09542	H6	8.787	19.5	18.5-20.9	17.3	16.6-19.8	B/C	A/B	
A09545	Mes	14.563			37.3	35.1-39.3	A	B	
A09546	L6	495.20	24.7	23.4-27.3	20.9	20.3-22.3	C	B/C	Maskelynite, shock vein
A09547	L6	47.413	25.0	22.5-27.0	21.0	19.4-24.5	B	A	Maskelynite, shock vein
A09549	H5	8.828	18.1	16.4-20.7	15.9	14.6-18.2	B	B	
A09550	L6	10.422	25.3	21.3-27.3	21.6	18.8-24.5	A/B	A	Maskelynite
A09552	H5	174.09	18.4	17.2-19.4	15.7	14.5-16.5	C	B	
A09565	H5	6.175	18.0	16.8-19.4	16.3	13.9-19.6	A/B	A	
A09576	H5	37.574	19.1	17.9-21.2	17.1	15.7-20.9	B/C	B	
A09578	L6	60.50	25.1	24.1-26.8	21.7	20.4-24.5	B	A	Maskelynite
A09579	L6	79.71	25.0	23.9-27.1	21.4	20.4-22.9	C	A/B	Maskelynite, shock vein
A09580	L6	50.691	25.4	23.9-27.0	21.4	18.6-23.3	B/C	A/B	Maskelynite
A09581	L6	32.203	25.1	24.1-27.3	21.5	20.7-23.3	B/C	A/B	Maskelynite
A09582	L6	11.581	25.4	24.1-28.2	22.0	19.9-25.5	A	A	Maskelynite, shock vein
A09583	L6	12.042	25.4	23.6-26.4	21.9	20.8-22.8	B	A	Maskelynite, shock vein, ringwood
A09584	L6	12.795	25.2	23.7-27.6	21.7	20.8-24.4	A/B	A/B	Maskelynite, shock vein, ringwood
A09585	L6	13.298	25.3	24.3-27.1	22.3	20.4-26.6	B	A	Maskelynite, shock vein
A09586	L6	11.443	25.1	21.8-27.2	22.2	20.2-25.2	B	A/B	Maskelynite, shock vein
A09587	L6	11.242	25.8	24.2-29.4	21.4	19.0-23.8	A/B	A	Maskelynite, shock vein
A09588	L6	7.243	25.1	20.8-27.5	21.5	20.5-22.7	B	B/C	Maskelynite, shock vein
A09589	L6	11.800	25.2	22.8-29.9	21.6	20.3-22.8	A	A/B	Maskelynite, shock vein
A09590	L6	7.882	25.3	24.1-28.6	21.5	20.9-22.7	A	A	Maskelynite, shock vein
A09591	L6	6.683	25.1	24.1-26.4	21.3	19.7-24.2	A/B	A	Maskelynite, shock vein, ringwood
A09592	L6	7.223	25.1	23.4-28.5	21.5	20.3-22.7	A	A	Maskelynite
A09593	L6	6.385	25.0	22.9-26.6	21.1	20.0-22.2	A	A	Shock vein
A09594	L6	7.412	25.0	23.8-28.3	21.1	20.5-22.7	A/B	A	Shock vein
A09595	L6	6.588	24.8	23.3-26.2	21.1	19.7-23.0	A	A	Maskelynite, shock vein

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A09608	H5	83.05	19.0	18.1-22.9	16.7	15.5-20.0	C	A	
A09609	H5	13.129	19.7	18.7-22.4	17.3	14.9-20.0	B	A/B	
A09610	H5	6.196	18.5	17.3-20.0	16.3	15.5-18.1	A	A/B	
A09618	H5	661.00	19.0	18.1-20.3	16.9	15.6-19.6	C	A	
A09619	H6	8.015	19.3	17.7-21.5	16.9	15.8-18.2	C	A/B	
A09624	H4	9.736	18.8	6.1-23.7	17.3	9.1-21.1	A	A	Breccia?
A09627	L6	40.293	25.6	24.0-27.3	21.0	20.6-21.5	C	A/B	
A09638	H5	16.306	19.9	18.3-22.3	17.4	16.0-20.5	A/B	A	
A09639	H5	7.323	18.6	17.9-19.5	16.2	14.8-18.7	B	A/B	
A09647	H6	7.479	20.8	19.6-23.5	17.6	17.1-18.1	C	A/B	
A09648	H5	17.001	18.3	17.0-21.5	16.8	15.3-19.9	B	A/B	
A09649	H5	15.520	18.1	16.8-20.2	16.8	14.8-19.0	A/B	A	
A09650	H5	10.917	17.9	17.2-19.6	16.2	14.4-18.2	A/B	A	
A09651	H5	10.416	18.4	16.9-20.9	16.7	15.6-20.0	A/B	A	Breccia
A09652	H5	6.158	17.6	16.6-19.6	16.5	15.0-19.1	A/B	A	
A10001	H5	23.448	19.2	17.7-21.9	16.8	15.2-19.4	A/B	A	
A10002	L4	1.784	24.5	22.9-26.7	20.4	18.9-22.4	A/B	B	
A10003	H6	4.021	18.8	16.9-19.9	16.7	15.4-18.8	A/B	A	
A10004	LL6	120.82	28.6	27.6-30.5	23.8	22.8-26.4	A	A/B	
A10006	H5	2.470	18.2	17.3-20.9	16.9	15.5-19.8	A/B	A	
A10007	H6	15.153	18.5	17.6-19.3	16.1	15.1-17.2	C	B	
A10008	L6	15.384	24.9	23.9-26.0	21.1	20.1-22.8	AB	A	Maskelynite
A10009	Ure	24.904	21.8	19.9-23.3			-	A/B	
A10010	H5	11.488	19.0	17.7-22.3	17.3	14.9-21.5	B	A	
A10013	L6	9.624	25.3	24.1-26.6	21.3	19.9-21.9	B/C	A/B	
A10014	CM	41.626	6.7	0.2-28.6	4.2	2.0-6.4	-	A	
A10017	LL4	13.880	27.1	25.4-28.0	22.5	20.9-23.8	B	A/B	
A10019	H3-5	4.142	19.5	18.6-20.3	17.4	16.4-19.2	B	A	Genomict breccia
A10020	H6	1.655	19.3	18.5-20.4	16.8	15.3-17.7	B	A/B	
A10021	H3	9.382	18.3	7.3-31.4	14.7	3.1-40.9	B	B	
A10022	L6	2.518	24.9	23.9-25.8	21.1	20.2-23.0	A/B	A	Maskelynite
A10023	LL5	3.531	28.9	27.7-31.1	23.4	22.4-24.1	A	A	
A10024	L6	11.339	25.5	24.3-27.8	21.1	19.5-22.7	B	A/B	
A10026	LL6	13.992	29.1	28.0-31.8	23.9	23.0-25.5	A	A/B	Recrystallized breccia
A10027	L5	11.836	24.9	22.9-27.2	21.3	19.9-25.3	A	A	
A10030	H4	9.943	18.3	17.1-19.0	15.9	14.7-16.5	C	A/B	
A10031	L4	21.173	24.6	22.3-26.6	19.4	14.2-23.3	A/B	A	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A10032	H3	6.309	19.0	16.8-22.2	13.4	4.6-28.6	B	B	
A10033	L3	1.688	19.3	7.4-25.5	14.2	5.1-28.8	C	A	
A10034	L6	1.684	24.6	23.1-25.7	20.8	20.1-22.7	A/B	A	Maskelynite
A10035	L6	8.581	25.4	23.9-27.9	21.8	20.8-24.8	B	A/B	Shock vein
A10037	L5	6.127	24.8	23.7-26.3	21.6	19.5-25.3	A	A	
A10038	H5	3.145	18.3	17.4-19.1	16.9	14.3-21.4	B	A	
A10039	LL6	7.722	29.8	28.4-31.7	23.8	17.0-27.3	B	A/B	Melt breccia clast
A10041	H5	3.422	19.4	18.0-20.8	17.0	15.1-19.3	B	A	
A10042	L3	2.913	24.8	23.9-26.1	20.0	16.3-22.5	B	A	
A10043	H	9.326	19.3	17.2-23.6	16.7	15.3-18.0	B/C	A/B	Melt breccia with type 4 clast
A10044	L6	60.70	25.0	23.9-26.6	20.8	19.4-21.3	A	A	
A10048	L5	1.475	24.6	23.6-26.2	20.7	19.6-22.4	A/B	A	
A10049	H5	19.895	17.9	16.8-19.4	16.3	15.2-21.5	B	B	
A10051	LL4-6	2.128	29.1	23.8-31.6	24.4	14.5-33.6	A/B	A/B	Genomict breccia
A10056	L5	11.641	24.5	23.4-26.3	20.9	20.1-23.8	B/C	A/B	
A10057	L6	5.595	24.7	23.3-26.5	20.6	19.7-23.7	B	A	
A10060	LL6	10.284	31.4	30.0-33.3	26.4	25.2-28.2	A	A/B	Recrystallized breccia
A10061	H6	1.745	19.8	18.3-23.2	17.4	16.3-19.4	B	A	
A10068	H4	3.177	19.5	16.8-23.6	14.7	7.8-16.9	A	A	
A10069	H4	1.460	19.0	17.0-20.7	16.9	15.0-22.9	A/B	A/B	
A10070	L6	18.612	25.7	24.4-27.8	22.0	20.9-23.9	A/B	A	Maskelynite, shock vein
A10071	H3	2.837	18.7	17.8-21.1	15.2	7.7-20.1	C	B/C	
A10073	H5	1.130	18.7	17.7-20.4	16.7	15.4-19.8	C	A/B	
A10076	L6	113.52	25.2	23.6-27.0	21.1	19.5-25.1	A	A	Shock vein
A10077	Win	115.60	5.4	5.1-5.6	6.3	6.1-6.6	A	A/B	FeNi ~50 vol%
A10078	H5	7.980	18.7	17.8-19.8	16.3	15.4-18.1	B/C	A	
A10079	H4	13.307	19.4	18.0-21.2	16.7	16.0-19.2	B	B	Monomict breccia
A10080	H	15.857	20.1	18.6-24.1	17.3	15.4-20.4	B/C	B	Melt breccia
A10081	H	8.051	19.3	18.2-21.3	16.9	14.9-19.2	B	A	Melt breccia
A10083	L3	25.448	16.8	0.2-33.6	11.1	1.0-37.3	B	B	
A10084	H5	2.108	19.1	18.3-21.1	17.0	15.2-19.4	B	A/B	
A10085	L4	1.141	22.9	18.0-23.8	24.5	23.2-25.7	A/B	A/B	Exsotic frag (Fa3.3-4.7)
A10086	Euc	1.042			36.1	31.5-48.5	-	A/B	Breccia
A10087	H3	10.968	24.0	11.2-25.5	16.1	8.7-24.1	B	A	
A10090	H6	18.702	19.8	18.9-20.6	17.1	15.8-18.8	A/B	B	
A10091	LL6	223.51	28.6	27.2-31.0	23.4	22.3-24.8	B	A	
A10092	H6	16.292	19.5	18.8-20.5	17.0	15.4-18.9	A	A/B	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A10093	L6	2.927	25.3	23.3-29.3	20.8	20-22.1	A/B	A/B	
A10094	LL5	5.450	28.6	26.9-31.7	23.0	22.0-23.5	B	A	Breccia
A10095	L6	3.633	25.1	24.0-26.7	20.8	19.8-22.0	A	A/B	
A10097	L6	235.19	25.5	24.1-27.9	22.3	20.4-25.0	B	A	Maskelynite, shock vein
A10098	H5	21.712	19.8	18.6-21.2	17.7	15.9-21.2	B	A	
A10103	L6	44.494	25.6	24.3-29.2	22.4	21.0-27.7	B	A	Maskelynite, shock vein, ringwood
A10105	H5	29.975	19.9	18.4-21.7	17.8	15.9-20.9	B/C	A	Shock vein
A10107	LL6	1.174	31.1	29.6-33.4	24.8	23.0-25.8	A/B	A	
A10108	H6	24.537	19.3	17.8-20.7	16.6	8.0-21.1	B	B	Maskelynite
A10109	H5	3.715	19.9	18.9-22.5	17.3	16.0-20.2	B	B	
A10110	H4	1.068	19.2	16.9-24.3	17.0	15.6-21.5	B/C	A/B	
A10111	CM2	1.759	16.1	0.1-59.5	1.1	0.6-1.8	-	A	
A10112	H4	3.500	18.6	16.6-21.5	15.7	6.5-17.9	B	A	
A10113	H5	34.220	19.6	18.8-21.3	17.2	15.7-19.5	B/C	A	
A10114	H5	49.502	19.1	18.1-22.1	17.5	15.6-21.1	B	B	
A10115	H5	1.590	19.5	17.5-27.7	17.2	16.3-19.0	C	A/B	Breccia
A10120	L6	2.794	25.3	24.7-26.1	21.6	20.7-23.7	B	A/B	
A10121	H5	9.174	19.1	18.3-21.6	16.3	10.3-17.6	C	A	
A10122	LL6	9.072	28.9	28.1-30.2	23.4	22.3-24.6	A	A	
A10123	H4	91.14	16.6	14.8-18.7	14.7	13.7-16.8	B	A/B	
A10124	L4	2.878	24.0	20.0-26.1	20.5	11.4-30.6	A	A	
A10125	L5	7.665	25.1	23.9-28.8	21.0	20.2-22.9	B	B/C	
A10126	E	2.191			0.5	0.1-2.2	C	B/C	
A10127	H5	3.080	17.9	16.2-19.6	15.8	15.1-17.1	A/B	A	
A10128	L6	1.396	25.3	24.2-26.4	21.6	20.8-23.8	B	A	
A10132	H4	24.150	18.3	17.4-19.2	16.0	13.2-17.0	B/C	B	
A10133	LL4-6	2.100	30.0	29.0-31.3	23.8	21.5-25.2	A	A/B	Genomict breccia
A10134	H5	1.060	17.7	16.6-19.5	16.1	14.6-17.0	A/B	A	
A10135	LL6	6.694	29.5	28.6-32.8	23.8	21.9-26.2	A	A	
A10136	LL6	6.311	29.2	27.9-30.6	24.1	23.3-26.3	A	A/B	
A10137	L6	1.500	25.3	24.5-26.4	20.9	19.8-22.7	B/C	A/B	
A10138	LL5	1.120	29.1	28.4-31.4	23.9	23.1-26.6	A	A/B	
A10140	H4	26.416	18.9	17.7-20.4	17.1	16.0-19.4	B	A	
A10141	H6	1.021	19.4	18.1-20.2	17.1	15.9-18.6	B	B	
A10143	Mes	1.505	40.4	40.4-40.4	40.1	31.8-44.1	A/B	B	
A10145	H5	2.756	19.3	18.1-22.6	17.0	15.9-19.5	B/C	A/B	
A10147	H5	81.21	20.0	18.6-22.4	17.7	14.5-20.2	B	A	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A10149	H5	3.286	19.0	17.6-21.4	17.3	15.5-20.8	A/B	A	
A10151	LL3-6	11.152	29.8	28.9-30.7	23.6	14.6-27.4	B	A/B	Genomict breccia
A10153	H4	2.758	18.8	18.2-19.3	16.6	15.7-17.6	B	A/B	
A10155	H5	1.449	20.0	19.0-21.3	17.6	16.6-19.8	A/B	A/B	
A10156	LL3-6	5.643	30.0	26.5-33.2	24.3	20.3-26.3	A	A	Genomict breccia
A10157	LL3-6	21.260	30.3	29.4-32.5	22.4	5.6-26.6	A	B	Genomict breccia
A10158	LL5	3.397	28.9	27.6-29.6	23.7	22.4-27.0	A	B	
A10161	L6	2.420	25.4	24.4-26.0	21.3	20.5-22.5	A	A	
A10162	H4-5	11.800	19.3	17.7-21.3	17.5	16.1-21.9	B/C	A	Genomict breccia
A10163	L5	4.953	25.0	24.3-26.2	21.2	20.2-23.1	A/B	A/B	
A10164	EH3	16.402	1.4		2.5	0.2-16.5	A	B	Shock vein
A10165	E4	1.429	0.4		1.6	0.3-2.9	A/B	A	
A10166	L6	2.732	24.9	24.2-28.8	20.8	19.3-21.4	B	B	
A10167	CM	2.525	10.8	0.3-40.7	2.2	0.8-7.1	-	B	
A10168	L6	1.937	25.1	24.2-27.1	20.7	19.1-21.4	B	A	Shock vein, maskelynite
A10169	H5	1.590	19.2	17.9-21.4	16.9	15.6-18.7	B/C	A	
A10170	H6	5.957	19.6	18.9-20.4	17.0	16.0-17.8	A	A	
A10172	LL6	1.788	31.2	30.2-32.4	25.2	24.3-26.0	A	A/B	Recrystallized breccia
A10173	LL6	4.584	29.5	27.6-30.5	25.0	23.1-28.9	B	B	Breccia
A10174	H6	8.016	20.2	18.1-21.6	18.0	16.0-23.7	B	B	Shock vein
A10175	H6	10.406	18.6	17.6-19.2	16.3	15.7-17.2	C	B	
A10176	LL5	5.081	28.1	26.6-29.5	23.3	22.6-24.4	A/B	B	Breccia
A10177	H5	233.82	17.9	16.9-19.8	15.6	14.0-18.3	B/C	A/B	
A10178	H5	200.29	18.0	16.6-20.1	15.8	14.1-19.7	B/C	A/B	
A10179	H5	440.21	19.4	17.6-22.7	16.7	15.5-18.4	A/B	A	
A10180	H5	69.65	18.8	16.9-20.2	16.5	15.0-20.0	B	A/B	
A10181	L6	32.363	25.1	23.6-26.4	21.7	20.0-22.8	A/B	A/B	Maskelynite, shock vein
A10182	H5	540.01	19.5	18.6-21.1	17.2	15.0-20.5	A/B	A/B	
A10183	CV3	8.526	4.2	0.2-10.0	4.6	1.1-13.7	-	A	
A10185	H5	395.98	19.6	18.5-21.8	17.2	15.4-21.2	B	A	
A10186	H4	9.506	18.0	17.3-18.7	15.7	14.5-16.5	B	A/B	
A10187	L5	150.21	25.1	23.7-26.9	21.5	19.6-25.8	B	A/B	
A10188	H5	160.13	18.6	17.6-19.7	16.2	14.8-18.7	B	B	
A10190	H5	4.231	19.8	17.8-21.6	17.7	15.7-20.4	B/C	A/B	
A10193	H6	9.882	18.8	17.8-19.8	16.6	15.0-17.2	C	B	
A10194	H5	12.552	19.1	18.3-21.1	16.7	15.1-19.0	C	A	
A10195	H5	7.723	18.9	17.2-22.8	16.8	16.0-18.7	C	A/B	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A10196	H5	5.025	19.5	17.4-22.4	18.0	16.7-21.5	B	A	
A10198	CO3	70.72	5.4	0.2-36.7	2.8	0.5-9.5	-	A/B	
A10199	H6	31.315	19.1	18.1-19.7	16.7	14.3-18.1	C	B	
A10200	H5	25.906	18.2	17.7-19.6	16.5	14.7-26.0	B/C	A/B	
A10201	H5	336.58	18.5	17.1-19.5	16.4	15.7-17.0	C	A/B	
A10202	H6	13.624	18.4	17.5-19.6	16.3	15.5-16.9	A	A/B	
A10203	H4	24.331	17.6	1.0-19.5	15.0	4.4-17.5	B	B	
A10204	H6	9.217	19.3	18.1-20.2	16.8	15.4-17.4	A	A/B	
A10205	L6	20.273	25.2	24.2-26.0	21.1	20.4-21.7	A/B	B	
A10207	H5	10.481	18.6	18.0-19.3	16.4	15.8-17.1	B	A/B	
A10210	H5	10.527	19.1	17.7-20.6	16.6	15.5-17.4	C	A	
A10211	L6	223.13	25.2	24.2-29.3	21.5	19.9-23.6	B	A/B	
A10212	E6	5.370			0.3	0.0-2.0	B	B	
A10213	H5	6.707	19.2	17.8-20.6	17.4	15.0-20.5	B	A/B	
A10215	L6	158.79	25.6	23.8-28.0	21.5	18.7-24.1	B	A	Maskelynite
A10217	H5	23.470	17.5	16.4-19.0	15.5	14.5-16.9	B	A/B	
A10218	H6	7.150	18.1	17.1-19.2	16.0	14.9-17.4	B	B	
A10219	H5	4.203	18.1	16.5-18.9	15.9	15.2-16.6	B	A/B	
A10220	L6	12.173	25.1	24.2-26.5	21.1	19.6-21.8	A/B	A/B	
A10222	CK4	5.531	30.5	29.1-32.4					
A10223	H5	16.938	18.6	16.6-19.9	16.4	14.3-20.4	B/C	A	
A10224	L3	108.52	24.3	23.4-25.1	15.8	9.4-23.2	B	A/B	
A10225	H5	23.406	19.0	17.5-20.2	16.8	16-18.6	B/C	A/B	
A10227	H5	31.601	17.9	16.9-20	15.9	14.7-17.5	B/C	A/B	
A10229	H5	6.275	19.1	17.7-20.3	17.4	9.9-24	B	B/C	
A10230	H6	127.50	19.9	18.4-25.1	17.3	16.0-18.3	B	B	
A12001	LL6	7.476	30.7	29.6-32.2	24.5	24-25.6	A/B	A/B	
A12002	H5	225.17	19.6	18.8-20.9	17.4	16.1-19.9	B/C	A	
A12006	H4	37.222	17.7	16.4-19.7	15.6	14.6-17.7	B	A	
A12007	H5	29.400	19.6	18.0-22.3	17.0	15.8-20.3	B	A	
A12008	LL6	81.95	31.3	30.2-33.3	25.5	23.4-28.4	B	A/B	
A12009	L6	353.33	25.2	24.3-26.4	21.2	19.7-23.0	A	A/B	
A12010	H5	88.86	20.5	19.2-21.7	17.5	16.3-20.3	B/C	A/B	
A12011	LL4-6	113.31	30.6	28.5-33.3	24.9	22.9-26.3	A	A/B	Genomict breccia
A12015	Dio	105.18			26.9	24.7-29.4	-	A	
A12017	H4-5	14.182	19.9	18.2-21.5	17.8	15.5-31.3	B	A	
A12019	L6	107.76	25.1	24.1-26.8	20.8	20.2-21.6	A	A	

Table 1. *Continued.*

Meteorite	Class	Wt. (g)	Fa	Range	Fs	Range	W	F	Comments
A12022	L6	36.747	25.1	23.8-26.8	21.4	20.0-24.6	A/B	A	
A12023	LL4-6	25.340	30.6	25.4-32.4	24.7	21.4-25.9	A	A	Genomict breccia
A12025	H5	11.724	18.2	16.3-20.8	16.1	14.8-18.7	B	A	
A12028	L6	2.712	25.8	24.8-33.4	21.5	20.7-23.1	A/B	A	
A12031	CM2	32.188	1.9	0.1-25.5			-	A	
A12033	L5	32.042	25.7	24.2-29.1	21.7	20.2-24.9	A/B	A/B	
A12034	H5	8.447	18.6	17.3-19.2	16.5	15.0-18.8	A	A	
A12035	L6	19.787	25.3	24.3-26.2	21.1	20.2-21.8	A	A	
A12039	H5	102.63	19.0	17.3-21.7	16.7	14.7-18.1	C	A/B	
A12041	L4	28.254	24.3	23.2-25.8	20.1	16.0-22.6	B	A	
A12045	L6	38.014	25.2	24.4-26.9	20.9	18.0-24.6	B/C	A	
A12047	CK4	27.694	33.9	32.7-34.8			-	A	
A12048	H4	59.610	20.1	18.8-21.9	16.1	8.3-19.3	B	A	
A12049	L6	12.034	25.1	24.2-26.2	21.4	20.5-22.9	A	A	
A12051	H4-6	25.752	19.2	18.0-20.1	17.0	15.7-20.5	B	A	Genomict breccia
A12052	L6	27.445	25.0	24.3-25.9	21.1	20.3-22.1	A	B/C	
A12054	H4	38.694	18.0	17.1-18.7	16.0	14.5-18.3	B	A	
A12055	LL3	9.928	21.6	0.4-59.3	10.8	2.0-19.7	B/C	A	
A12056	L4	120.04	22.9	21.3-23.7	18.6	16.4-19.9	A	A/B	
A12057	E	4.456			0.6	0.1-2.9	A	A	Melt breccia
A12062	H5	27.660	18.2	17-20.6	15.8	15.3-16.2	B	A	
A12063	L6	3.958	25.4	24.7-27.2	21.2	19.7-22.5	B	A	
A12064	H5	3.852	19.1	18.3-19.9	17.0	15.5-19.2	B	A/B	
A12065	LL5-6	3.644	29.7	21.8-32	24.2	21.1-26.2	A	A/B	Genomict breccia
A12066	LL4-6	13.543	30.7	27.7-32.6	24.2	21.3-26.3	A/B	A/B	Genomict breccia
A12067	H6	2.211	18.7	18.3-19.1	17.2	16.2-20.1	C	A/B	
A12068	H5	44.504	17.9	16.9-19.3	16.7	15.6-19.3	C	A/B	
A12069	H5	17.030	19.1	17.9-22.3	16.7	15.9-18.1	B/C	A/B	
A12070	L5	25.373	22.6	21.8-23.7	19.6	18.2-21.0	C	A/B	
A12389	LL3-6	18066.2	29.3	27.9-31.8	23.6	21.2-25.4	A	A	Genomict breccia, shock vein

Notes for Table 1

Class.

br: breccia; melt br; melt breccia; poly: polymict; ano: anomalous; “-“ (e.g., H5-6): genomict breccia; “/” (e.g., H5/6): transitional.

F: fracturing index:

A: No or a few narrow cracks are visible.

B: Several cracks extend across exterior surface.

C: Severe cracks.

W: weathering index:

A: Limonite haloes on metal particles and limonite veins are minor.

B: 7.5 to 35% of metal particles are weathered to limonite.

C: Most metal particles are weathered to limonite.

Figure 1. Descriptions and photomicrographs of selected meteorites.

A 09317

The PTS is composed of olivine and elongate pyroxenes. Olivine generally shows dark appearance due to the presence of minute ($<1\ \mu\text{m}$) inclusions (Fe metals). Grain boundaries of minerals are filled with gray materials (weathering products). Irregular carbonaceous materials occur in dark olivine. Olivine compositions vary widely ($\text{Fa}_{20.0-1.0}$). Pyroxene compositions are $\text{Wo}_{5.2-5.7}\text{En}_{75.2-78.6}\text{Fs}_{15.9-19.4}$. This meteorite is an ureilite. Width = 4.67 mm.



A 10222

The PTS contains sparse chondrules (range from 0.2-3 mm in diameter). Irregular-shaped ($\sim 10-200\ \mu\text{m}$) opaque minerals (magnetite, sulfides) are scattered both in chondrules and matrix. Olivine compositions are $\text{Fa}_{29.1-32.4}$. This meteorite is a CK chondrite (type 4). Width = 4.67 mm.



A 12015

The PTS is a breccia composed of angular fragments of orthopyroxene and minor chromite ($< 4\ \text{mm}$). Orthopyroxene generally shows weak mottled extinction. Pyroxene compositions are relatively ferroan ($\text{Wo}_{2.2-3.1}\text{En}_{67.5-72.6}\text{Fs}_{24.7-29.4}$). This is a brecciated diogenite. Width = 4.67 mm.

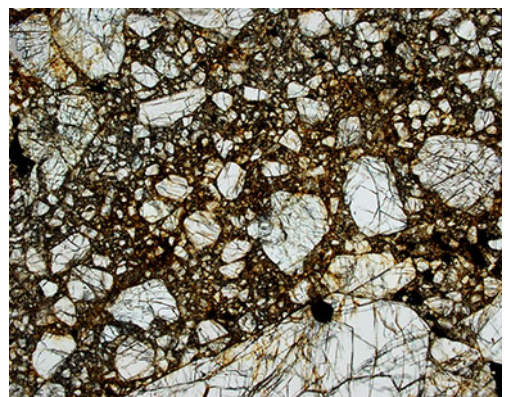


Figure 1. *Continued.*

A 12389

A 12389 is the largest meteorite (18 kg) found in the 2009-2012 expeditions. It is mostly covered by black fusion crust (figure on the top, cube = 1 cm). The PTS (lower figure, Width = 4.7 mm) shows a breccia composed of clasts of LL chondrites (LL3-6), chondrules, and impact melt clasts.

