

NATURAL THERMOLUMINESCENCE (NTL) DATA FOR ANTARCTIC METEORITES

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The measurement and data reduction methods were described by Hasan et al. (1987, Proc. 17th LPSC E703-E709; 1989, LPS XX, 383-384). For meteorites whose NTL lies between 5 and 100 krad the natural TL is related primarily to terrestrial age. We suggest meteorites with NTL > 100 krad are candidates for an unusual history involving high radiation doses and/or low temperatures. Samples with NTL <5 krad have TL below that which can reasonably be ascribed to long terrestrial ages. Such meteorites have had their TL lowered by heating within the past million years or so (by close solar passage, shock heating, or atmospheric entry), exacerbated, in the case of certain achondrite classes, by "anomalous fading". Included in this table are data for seven meteorites (ALHA and MBRA samples) measured as part of an interlaboratory comparison in collaboration with W.A. Cassidy (University of Pittsburgh). (July 1990 data set).

Sample	Class	NTL [krad at 250 deg. C]			Sample	Class	NTL [krad at 250 deg. C]		
LEW 88008	DIO	6.4	+/-	0.4	MAC 88137	L6	23.4	+/-	0.1
LEW 88006	URE	<1			MAC 88148	L6	87.0	+/-	0.8
LEW 88001	C2	<1			MAC 88159	L6	13.4	+/-	0.1
MAC 88122	LL5	108.2	+/-	0.3	MAC 88162	L6	9.6	+/-	0.1
MAC 88106	LL6	93.9	+/-	0.4	MAC 88181	L6	15.0	+/-	0.2
MAC 88113	LL6	21.8	+/-	0.1	MAC 88193	L6	15.6	+/-	0.1
MAC 88109	L5	28.4	+/-	0.1	MAC 88197	L6	14.0	+/-	0.2
MAC 88118	L5	1.7	+/-	0.1	MAC 88174	H3	20	+/-	8
MAC 88127	L5	10.2	+/-	0.1	LEW 88019	H4	55.7	+/-	0.3
ALHA77155	L6	25.4	+/-	0.1	LEW 88020	H4	56.5	+/-	0.1
ALHA79007	L6	27.6	+/-	0.1	MAC 88111	H4	29.0	+/-	0.1
ALHA79033	L6	0.2	+/-	0.1	MAC 88124	H4	10.7	+/-	0.1
ALHA81099	L6	2.6	+/-	0.1	LEW 88013	H5	14.8	+/-	0.2
ALH 84066	L6	0.4	+/-	0.1	LEW 88014	H5	39.4	+/-	0.2
LEW 88015	L6	12.0	+/-	0.1	MAC 88103	H5	74.6	+/-	0.2
LEW 88016	L6	110.7	+/-	0.4	MAC 88108	H5	65.2	+/-	0.4
LEW 88017	L6	23.0	+/-	0.1	MAC 88110	H5	81.6	+/-	0.5
LEW 88018	L6	14.6	+/-	0.1	MAC 88114	H5	20.3	+/-	0.1
LEW 88058	L6	69.7	+/-	0.8	MAC 88115	H5	167	+/-	1
MAC 88112	L6	52.5	+/-	0.1	MAC 88116	H5	3.7	+/-	0.1
MAC 88117	L6	7.2	+/-	0.1	MAC 88119	H5	103.0	+/-	0.4
MAC 88121	L6	6.7	+/-	0.1	MAC 88120	H5	77.5	+/-	0.2
MAC 88126	L6	20.4	+/-	0.1	MAC 88128	H5	127.7	+/-	0.4
					MAC 88129	H5	111.8	+/-	0.5
					MAC 88134	H5	0.5	+/-	0.1
					MAC 88135	H5	40.3	+/-	0.2

Benoit P., Myers B., Sears H., and Sears D. (1990) Natural thermoluminescence data for Antarctic meteorites. *Antarctic Meteorite Newsletter* 13(3), 20-22. Johnson Space Center, Houston TX.

MAC 88138	H5	40.2	+/-	0.3	MAC 88123	H6	51.0	+/-	0.5
MAC 88139	H5	41.7	+/-	0.1	MAC 88125	H6	21.9	+/-	0.1
MAC 88147	H5	31.7	+/-	0.1	MAC 88130	H6	47.0	+/-	0.2
MAC 88164	H5	31.3	+/-	0.1	MAC 88132	H6	61.8	+/-	0.6
MAC 88195	H5	87.2	+/-	0.3	MAC 88133	H6	58	+/-	1
MAC 88196	H5	72	+/-	1	MAC 88191	H6	80.3	+/-	0.1
ALHA76008	H6	8.5	+/-	0.3	MBRA76001	H6	10.4	+/-	0.3
HOW 88400	H6	11.4	+/-	0.1					

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

PAIRING OF ANTARCTIC METEORITES BASED ON THERMOLUMINESCENCE DATA

by

Paul Benoit, Hazel Sears, and Derek Sears

The following comments on pairings of meteorites are based on the natural TL data (Table 4), TL sensitivity, the shape of the induced TL glow curve, classifications, and JSC curatorial staff and Arkansas group sample descriptions. The procedures are described in Sears et al. (1990, LPSC XXI, 1121-1122). Unless otherwise noted, suggested pairings are considered "probable" as opposed to "possible" or "tentative".

1. TL data confirm pairings suggested in the Newsletter:

H4: LEW88019 and LEW88020 (AMN 13:2)

H6: MAC88132 and MAC88133 (AMN 12:3)

2. TL data do not confirm pairings suggested in the Newsletter:

H6: MAC88130 is not paired with MAC88132 and MAC88133 (AMN 13:2)

3. Additional pairings suggested by TL data:

L6: LEW88015 and LEW88018 (tentative)

L6: MAC88117 and MAC88121 (possible)

L6: MAC88159, MAC88181, MAC88193, and MAC88197

H5: MAC88103 and MAC88120 (possible)

H5: MAC88135, MAC88138, and MAC88139

H5: MAC88147 and MAC88164

COMMENTS ON THE THERMOLUMINESCENCE PROPERTIES OF SPECIFIC METEORITES

by

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1. MAC88174 was tentatively assigned to petrographic type 3.6 by Mason (AMN 13:2). The induced TL measurements indicate that it is type 3.4-3.5.

2. ALHA samples 77155, 79007, 79003, 81099, 84066, and 76008 and MBRA76001 have known ^{26}Al contents and confirm the observations of Hasan et al. (1987, Proc. 17th LPSC E703-709). Specifically, four of the samples (MBRA76001, ALHA81099, ALHA 84066 and ALHA79033) plot in the field of high ^{26}Al and low NTL, described earlier and suggestive of a highly anomalous thermal and/or radiation history. The remainder of the samples fall on the terrestrial age trend.

3. The following comments relate to samples in the TL table reported in AMN(13:2)

A. Euc: LEW85300, LEW85302, LEW85303, and LEW88005 have unusual induced TL properties and have probably been shocked. See Batchelor and Sears (1990, LPSC XXI, 54-55) for details.

B. C2: MAC88107, MAC87300, and MAC87301 have distinct TL properties from other C2 chondrites. The TL properties of these meteorites resemble those of the unusual carbonaceous chondrites Colony, ALHA77307 and LEW85332 (see Sears et al., 1990, LPSC XXI, 1121-1122).

C. L6: EET87536, EET87561 (AMN 12:3), and EET87583 have unusual induced TL suggestive of shock. Petrographic examination by B. Mason shows that EET87536 and EET87561 contain shock-produced maskelynite, while EET87583 does not appear severely shocked but contains a metal veinlet.

D. L6: EET87827 has TL properties similar to the EET87569 group, but appears in hand specimen to be a regolith breccia with light-dark structure.