

NATURAL THERMOLUMINESCENCE DATA FOR ANTARCTIC METEORITES

Natural Thermoluminescence (NTL) data obtained by Ben Myers, Hazel Sears, Fouad Hasan, Roberta Score and Derek Sears at the University of Arkansas. The measurements and data reduction methods were described by Hasan et al. (1987, Proc. 17th LPSC E703-E709; 1989, LPS XX, 383-384). Also included are data for the 23 meteorites discussed by Hasan et al. (1987), reduced using our current methods, and some preliminary notes on pairing and other observations. (February 1990 data set).

Sample	Class	NTL [krad at 250 deg. C]		Sample	Class	NTL [krad at 250 deg. C]	
HOW 88401	Euc	6.9	+/- 1.3	EET 87601	L6	11.8	+/- 0.1
LEW 85303	Euc	24	+/- 2	EET 87603	L6	12.1	+/- 0.1
LEW 88005	Euc	23	+/- 2	EET 87607	L6	42.8	+/- 0.7
EET 87512	How	16	+/- 1	EET 87613	L6	12.2	+/- 0.1
MAC 88102	Mes	1.1	+/- 0.3	EET 87615	L6	0.8	+/- 0.1
LEW 85309	C2	<1		EET 87616	L6	12.9	+/- 0.1
MAC 88100	C2	<1		EET 87622	L6	22.1	+/- 0.7
MAC 88107	C2	13.9	+/- 0.4	EET 87623	L6	15.4	+/- 0.2
ALH 85003	C3O	66	+/- 9	EET 87626	L6	7.9	+/- 0.1
LEW 85332	C3O	55	+/- 28	EET 87635	L6	8.7	+/- 0.1
EET 87851	LL5	78	+/- 2	EET 87639	L6	20.3	+/- 0.1
LEW 87049	L4	40	+/- 2	EET 87644	L6	27	+/- 1
ALHA77002	L5	17.2	+/- 0.4	EET 87652	L6	9.9	+/- 0.2
EET 87570	L5	22.0	+/- 0.4	EET 87655	L6	66	+/- 2
EET 87774	L5	18.0	+/- 0.4	EET 87660	L6	11.3	+/- 0.3
ALHA77261	L6	14.0	+/- 0.3	EET 87661	L6	20.7	+/- 0.7
ALHA77296	L6	1.54	+/- 0.08	EET 87744	L6	103	+/- 2
ALHA77297	L6	2.5	+/- 0.2	EET 87756	L6	17.9	+/- 0.3
ALHA78043	L6	11.0	+/- 0.1	EET 87758	L6	25.6	+/- 0.5
ALHA78105	L6	45.3	+/- 0.5	EET 87759	L6	53	+/- 1
ALHA78112	L6	27.9	+/- 0.7	EET 87768	L6	58	+/- 1
ALHA78114	L6	14.9	+/- 0.8	EET 87788	L6	14.6	+/- 0.5
ALHA78251	L6	49.6	+/- 0.5	EET 87789	L6	9.6	+/- 0.1
ALH 85014	L6	2.0	+/- 0.2	EET 87794	L6	15.2	+/- 0.1
ALH 85095	L6	1.0	+/- 0.2	EET 87796	L6	33.5	+/- 0.5
ALH 85157	L6	8.9	+/- 0.1	EET 87804	L6	33	+/- 1
EET 87555	L6	44	+/- 1	EET 87807	L6	20.6	+/- 0.2
EET 87569	L6	23.8	+/- 0.2	EET 87817	L6	19.3	+/- 0.4
EET 87583	L6	2.4	+/- 0.5	EET 87818	L6	135	+/- 4
EET 87586	L6	21.6	+/- 0.6	EET 87827	L6	21.1	+/- 0.4
EET 87587	L6	8.4	+/- 0.1	EET 87829	L6	10.9	+/- 0.9
EET 87589	L6	7.6	+/- 0.1	EET 87830	L6	12.7	+/- 0.1
EET 87594	L6	28.4	+/- 0.7	EET 87843	L6	47.7	+/- 0.3
EET 87596	L6	9.5	+/- 0.1	EET 87855	L6	10.5	+/- 0.1
				EET 87857	L6	23	+/- 7
				EET 87858	L6	8.9	+/- 0.4
				META78003	L6	38.6	+/- 0.6
				META78028	L6	22.7	+/- 0.7
				RKPA79001	L6	6.5	+/- 0.1
				RKPA80202	L6	0.46	+/- 0.01

Sample	Class	NTL [krad at 250 deg. C]		Sample	Class	NTL [krad at 250 deg. C]	
EET 87805	H3	6.4	+/- 0.1	EET 87790	H5	3.2	+/- 0.4
ALHA77004	H4	35.5	+/- 0.3	EET 87798	H5	8.7	+/- 0.1
ALHA77191	H4	34.5	+/- 0.3	EET 87821	H5	81	+/- 2
ALHA77262	H4	65	+/- 3	EET 87822	H5	15.2	+/- 0.2
ALHA77294	H5	4.8	+/- 0.1	EET 87840	H5	65.4	+/- 0.9
ALHA78102	H5	23.4	+/- 0.4	ALHA76008	H6	10.3	+/- 0.1
ALH 85021	H5	0.13	+/- 0.01	ALHA77258	H6	48	+/- 1
ALH 85145	H5	0.24	+/- 0.04	ALHA78076	H6	58	+/- 2
EET 87571	H5	29.0	+/- 0.1	ALHA78115	H6	48	+/- 2
EET 87577	H5	51.6	+/- 0.2	ALH 85032	H6	70	+/- 2
EET 87581	H5	69	+/- 2	ALH 85130	H6	0.5	+/- 0.1
EET 87754	H5	0.92	+/- 0.05	EET 87592	H6	48.3	+/- 0.8
EET 87755	H5	98	+/- 4	EET 87820	H6	44.3	+/- 0.5
				META78006	H6	1.6	+/- 0.2

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

NOTES

General comments: 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 last million years or so (close solar passage, shock heating, atmospheric entry), exacerbated, in the case of certain achondrite classes, by "anomalous fading". For samples whose NTL lies between 5 and 100 krad the natural TL is related, primarily, to terrestrial age.

Pairings: The following are comments on pairings based on the natural TL data above, TL sensitivity, the shape of the induced TL glow curve, classifications, and JSC curatorial staff and Arkansas group unpublished and published sample descriptions. Unless otherwise noted, suggested pairings are considered "probable" as opposed to "possible" or "tentative" by Hazel Sears and Derek Sears.

1. TL data confirm pairings suggested in the Newsletter.

Euc: LEW85303, LEW88005 (and presumably LEW85300 and LEW85302).

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

How: EET87512 has significantly higher natural TL and may not be paired with the EET87503 group.

3. Additional pairings suggested by the TL data.

C2: MAC88107 paired with MAC87300/301.

L5: EET87570, EET87774 (tentative).

L6: EET87583, EET87536 (tentative).

Benoit P., Myers B., Sears H. and Sears D. (1990a) Natural thermoluminescence (NTL) data for antarctic meteorites. *Antarctic Meteorite Newsletter* 13(2), 25-27. Johnson Space Center, Houston TX.

L6: EET87587, EET87858 and possibly EET87589.

L6: EET87596, EET87635, EET87789.

(The above two groups are tentatively paired with each other).

L6: EET87626, EET87652 (possible).

L6: EET87601, EET87603, EET87613, EET87616, EET87830, EET87855.

L6: EET87569, EET87586, EET87661, EET87807, EET87857.

L6: EET87622, EET87639.

(The above two groups are tentatively paired with each other).

L6: EET87756, EET87817.

L6: EET87594, EET87644.

L6: EET87796, EET87804.

H5: ALH85021, ALH85145 (tentative).

H5: EET87581, EET87840 (possible).

The following pairing was omitted from the September 1989 Newsletter.

L6: EET87502, EET87535, EET87567.

4. The following notes relate to pairings discussed by Scott (1989, *Smith. Cont. to Earth Sci* 28,103) for the 1977-80 samples run by Hasan et al, (1987).

- a). The TL data confirm the following pairings.

L6: ALHA77296, ALHA77297.

L6: ALHA78105, ALHA78251 (tentative).

H4: ALHA77004, ALHA77191.

- b). The TL data confirm that ALHA78112 is not paired with ALHA78114, and that RKPA79001 is probably not paired with RKPA80202.