

Table 4: 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, LPSC XX, 383-384). For meteorites whose TL lies between 5 and 100 krad, the natural TL is related primarily to terrestrial history. Samples with NTL <5 krad have TL levels 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 of so by close solar passage, shock heating, or atmospheric entry, exacerbated in the case of some achondrites by anomalous fading. We suggest meteorites with NTL >100 krad are candidates for unusual orbital/thermal histories (Benoit and Sears, 1993, EPSL, 120, 463-471).

Sample	Class	Natural TL [krad at 250°C]		Sample	Class	Natural TL [krad at 250°C]	
QUE97014	EUC	14	+ 4	QUE97036	L6	6.6	+ 0.3
QUE97053	EUC	12	+ 1	QUE97037	L6	5.8	+ 0.7
				QUE97038	L6	12.1	+ 0.1
QUE97001	How	3.3	+ 0.3	QUE97046	L6	41.9	+ 0.2
QUE97002	How	10.4	+ 0.5	QUE97049	L6	7.5	+ 0.1
				QUE97050	L6	8.6	+ 0.1
QUE97030	H3.4	32	+ 1	QUE97054	L6	48.3	+ 1.1
				QUE97057	L6	13.1	+ 0.2
QUE97006	H5	66	+ 4	QUE97078	L6	7.2	+ 0.3
DEW96600	H6	28.5	+ 0.4	QUE97013	LL5	40.7	+ 0.3
MET96506	H6	31.8	+ 0.4	QUE97015	LL5	10.4	+ 0.1
MET96520	H6	70.5	+ 0.7	QUE97016	LL5	8.2	+ 0.1
				QUE97017	LL5	3.5	+ 0.4
QUE97008	L3.4	5	+ 2	QUE97019	LL5	5.0	+ 0.5
MET96515	L3.5	12	+ 1.0	QUE97020	LL5	2.8	+ 0.3
				QUE97021	LL5	1.6	+ 0.2
QUE97034	L4	42.7	+ 0.5	QUE97024	LL5	6.1	+ 0.1
				QUE97025	LL5	1.2	+ 0.3
MET96507	L5	67	+ 1	QUE97026	LL5	65.9	+ 2.2
MET96510	L5	67.6	+ 0.1	QUE97028	LL5	41.3	+ 0.2
MET96513	L5	66.2	+ 0.5	QUE97040	LL5	1.4	+ 0.1
QUE97007	L5	89	+ 1	QUE97041	LL5	7.6	+ 0.1
QUE97022	L5	35.8	+ 0.3	QUE97042	LL5	0.7	+ 0.1
QUE97031	L5	23.8	+ 0.2	QUE97043	LL5	4.0	+ 0.3
QUE97039	L5	84.7	+ 0.3	QUE97045	LL5	10.7	+ 0.1
QUE97047	L5	46	+ 3	QUE97051	LL5	2.2	+ 0.9
QUE97048	L5	4	+ 1	QUE97052	LL5	8.0	+ 0.1
				QUE97058	LL5	9.4	+ 0.6
EET96021	L6	24.7	+ 0.1	QUE97059	LL5	7.9	+ 0.1
MET96509	L6	59	+ 1	QUE97069	LL5	6	+ 2
MET96511	L6	10.9	+ 0.1	QUE97070	LL5	0.5	+ 0.1
MET96512	L6	19.5	+ 0.1	QUE97085	LL5	7.5	+ 0.5
MET96514	L6	45.9	+ 0.5	QUE97086	LL5	12.3	+ 0.1
QUE97009	L6	93	+ 1				
QUE97018	L6	2	+ 2	QUE97010	LL6	18	+ 2
QUE97029	L6	9.4	+ 0.1	QUE97011	LL6	7	+ 1
QUE97032	L6	37.6	+ 0.1	QUE97012	LL6	2	+ 2
QUE97033	L6	10.3	+ 0.1	QUE97023	LL6	21.4	+ 0.1
QUE97035	L6	2	+ 2	QUE97044	LL6	5.4	+ 0.1

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Cosmochemistry Group (1999) Natural thermoluminescence (NTL) data for antarctic meteorites. *Antarctic Meteorite Newsletter* **22(2)**, 13. Johnson Space Center, Houston TX.

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

COMMENTS: The following comments are based on natural TL data, TL sensitivity, the shape of the induced TL glow curve, classifications, and JSC and Arkansas sample descriptions.

MET 96515 and QUE 97008 were classified as type 3.5 and 3.4, respectively (AMN 21:2 and AMN 22:1). Their TL sensitivities are similar to type 3.1 unequilibrated ordinary chondrites (Sears *et al.*, 1991, *Proc. Lunar Planet. Sci.*, 21, 493-512). It is possible these meteorites are highly shocked but only weak shock features were noted in QUE 97008 (AMN 22:1). Other meteorites with very low TL sensitivities and thus candidates for histories involving extensive shock processing are QUE 97010, QUE 97011, QUE 97012, QUE 07029, QUE 97033, QUE 97035, and QUE 97037.

QUE 97030 is confirmed as type 3.4 by TL sensitivity (AMN 22:1).

QUE 97014 and QUE 97053 have TL sensitivities similar to eucrites of petrologic type 5 in the classification system of Takeda *et al.* (1983, *Proc. 8th Symp. Antarctic Meteor.*, 181-205) and Batchelor and Sears (1991, *GCA*, 55, 3831-3844). It is, however, possible that QUE 97053 has a low TL sensitivity due to shock processing (AMN 22:1).

Pairings suggested by TL data:

EUC: QUE 97053 possibly with QUE 97014 (Note, however, strong petrographic differences, AMN 22:1)

L3: MET 96515 with MET 96503 (AMN 22:1)

L5: MET 96510 and MET 96513 with MET 96507

L5: QUE 97022 with the QUE 90218 group (AMN 15:2 and 18:2)

L5: QUE 97039 with QUE 97007

L5: QUE 97048 with the QUE 90205 group (AMN 15:2)

L6: QUE 97033 with QUE 97029

L6: QUE 97018, QUE 97029, QUE 97033, QUE 97035, and QUE 97037 with the QUE 94202 group (AMN 19:2)

L6: QUE 97049 with QUE 97036

LL5: QUE 97017, QUE 97019, QUE 97020, QUE 97021, QUE 97024, QUE 97025, QUE 97040, QUE 97041, QUE 97043, QUE 97045, QUE 97051, QUE 97052, QUE 97059, QUE 97086 and possibly QUE 97069 with QUE 97016.

LL5: QUE 97028 with QUE 97013

LL6: QUE 97012 with QUE 97011