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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 age and orbital history. 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". We suggest that meteorites with NTL > 100 krad are candidates for an unusual history involving high radiation doses and/or low temperatures.

Sample	Class	NTL [krad at 250 deg. C]	Sample	Class	NTL [krad at 250 deg. C]
WIS91600	C2	0	PAT91522	L5	11.8 +- 0.1
			PAT91537	L5	12.5 +- 0.1
PCA91238	E4	4.6 +- 0.7	PCA91032	L5	2.7 +- 0.2
			PCA91033	L5	2.0 +- 0.1
ALHA77112	H5	24.5 +- 0.2	PCA91036	L5	7.3 +- 0.9
ALHA78047	H5	1.2 +- 0.1	PCA91044	L5	8 +- 1
ALHA79054	H5	164.7 +- 0.4	PCA91046	L5	7 +- 1
PCA91043	H5	25.0 +- 0.1	PCA91050	L5	1.6 +- 0.2
PCA91051	H5	72.7 +- 0.1	PCA91056	L5	1.2 +- 0.1
PCA91239	H5	73.4 +- 0.6	PCA91211	L5	1.8 +- 0.2
			WIS91602	L5	16.2 +- 0.1
ALHA77111	H6	5.0 +- 0.1			
ALHA77271	H6	46.3 +- 0.3	EET90738	L6	30.0 +- 0.2
ALHA79002	H6	60 +- 1	PCA91057	L6	1.0 +- 0.1
ALHA80126	H6	3.9 +- 0.1	PCA91106	L6	6.2 +- 0.1
ALHA81037	H6	65.7 +- 0.6	PCA91107	L6	67.3 +- 0.1
ALHA81093	H6	15.2 +- 0.1	PCA91117	L6	40 +- 6
PCA91134	H6	103.0 +- 0.6	PCA91132	L6	38.2 +- 0.3
PCA91267	H6	18.3 +- 0.1	PCA91212	L6	10.3 +- 0.1
			PCA91271	L6	7.9 +- 0.1

The quoted uncertainties are the standard deviations shown by replicate measurements of 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 group sample descriptions.

PCA91117 may be shocked.

Pairings suggested by TL data:

H5: ALHA79054 with ALH88027 group (LPSC XXIV, 93-94)
H5: PCA91239 with PCA91040
H6: PCA91267 with PCA91026
L5: PCA91032 with PCA91030
L5: PCA91033, PCA91050 and PCA91056 with PCA91027
L5: PCA91036, PCA91044 and PCA91046 with PCA91028 group
L5: PCA91211 possibly with PCA91067