

## Natural Thermoluminescence (NTL) Data for Antarctic Meteorites

**Paul Benoit, Joyce Roth, Hazel Sears, and Derek Sears**  
 Cosmochemistry Group  
 Dept. of Chemistry and Biochemistry  
 University of Arkansas  
 Fayetteville, AR 72701

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 NTL 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 or shock heating), 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 and also have very short terrestrial ages. (July, 1993 dataset).

Sample	Class	NTL [krad at 250 deg. C]	Sample	Class	NTL [krad at 250 deg. C]
LAP91900	DIO	6 ± 1	PCA91028	L5	6.9 ± 0.1
PCA91007	EUC	5 ± 1	PCA91030	L5	2.4 ± 0.8
PCA91025	H5	42 ± 2	PCA91053	L5	6 ± 1
PCA91040	H5	77.5 ± 0.2	PCA91059	L5	6.6 ± 0.1
PCA91041	H5	63.2 ± 0.1	PCA91060	L5	7.7 ± 0.9
WIS91622	H5	61.6 ± 0.5	PCA91066	L5	8.5 ± 0.1
PCA91026	H6	20.7 ± 0.2	PCA91067	L5	0.9 ± 0.1
TIL91724	H6	77.7 ± 0.1	PCA91069	L5	7.4 ± 0.1
PCA91001	L4	112 ± 5	PCA91073	L5	7.7 ± 0.1
TIL91702	L4	17.4 ± 0.1	TIL91710	L5	20.5 ± 0.1
TIL91704	L4	17.2 ± 0.1	PAT91506	L6	10.1 ± 0.1
TIL91705	L4	50 ± 1	PAT91511	L6	14.5 ± 0.1
TIL91708	L4	58.8 ± 0.2	PCA91009	L6	0.4 ± 0.1
TIL91711	L4	10.7 ± 0.1	PCA91010	L6	2.5 ± 0.4
TIL91718	L4	21.2 ± 0.1	PCA91016	L6	1.3 ± 0.5
TIL91721	L4	53.5 ± 0.2	PCA91017	L6	1.1 ± 0.2
WIS91603	L4	153 ± 1	PCA91018	L6	0.8 ± 0.1
WIS91605	L4	171 ± 5	PCA91021	L6	1 ± 0.1
WIS91625	L4	48.3 ± 0.2	PCA91022	L6	0.8 ± 0.1
PAT91500	L5	0.1 ± 0.1	PCA91039	L6	13 ± 2
PAT91508	L5	10.5 ± 0.1	PCA91052	L6	9.9 ± 0.1
PCA91011	L5	83.1 ± 0.3	PCA91054	L6	20.5 ± 0.1
PCA91012	L5	60.2 ± 0.7	PCA91062	L6	4.3 ± 0.1
PCA91013	L5	62.9 ± 0.4	PCA91065	L6	10.1 ± 0.1
PCA91014	L5	57.8 ± 0.2	PCA91076	L6	18 ± 4
PCA91015	L5	54.2 ± 0.3	WIS91612	L6	7.6 ± 0.1
PCA91019	L5	69.0 ± 0.3	WIS91623	L6	45.8 ± 0.1
PCA91027	L5	1.3 ± 0.1	WIS91626	L6	68.5 ± 0.3
			WIS91628	L6	60.7 ± 0.1
			PAT91501	L7	20.4 ± 0.1

Sample	Class	NTL [krad at 250 deg. C]	Sample	Class	NTL [krad at 250 deg. C]
PCA91038	LL4	30.4 ± 0.3	PCA91023	LL6	1.1 ± 0.4
WIS91618	LL4	53.5 ± 0.1	PCA91002	UNGR	28.1 ± 0.2
WIS91601	LL5	110 ± 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 curve, classifications, and JSC and Arkansas group sample descriptions.

The PCA91028 and PCA91039 groups and PCA91067 appear to have been shocked.

1. Pairings: (Confirmations of pairings suggested in AMN15:2 and 15:3)

L4: TIL91702, TIL91704, and TIL91718.

L4: TIL91705, TIL91708, and TIL91721.

L5: PCA91012 and PCA91013.

L6: PCA91009, PCA91016, PCA91018, PCA91021 and possibly PCA91010.

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

L4: TIL91705 group with TIL91702 group (AMN 15:3).

L5: PCA91011 with PCA91012 group (AMN 15:2).

3. Additional pairings suggested by TL data:

L4: WIS91603 and WIS91605.

L5: PCA91028, PCA91053, PCA91059, PCA91060, PCA91066, PCA91069, and PCA91073.

L5: PCA91014 and PCA91015 with PCA91012.

L6: PCA91039 and PCA91076.

L6: WIS91626 and WIS 91628