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Crystal structure of kambaldaite, $Na_2Ni_8(CO_3)_6(OH)_6 \cdot 6H_2O$

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Abstract

A new carbonate mineral, kambaldaite, with the ideal formula $Na_2Ni_8(CO_3)_6(OH)_6 \cdot 6H_2O$, is hexagonal, $P6_3$, $a = 10.340(3)$, $c = 6.097(2)$Å; $Z = 1$. The structure has been determined from single crystal X-ray diffractometer data, and refined by full matrix least squares to a residual of 0.048 for 1157 independent "observed" reflections. Distorted NiO_6 "octahedra" are linked in a three-dimensional edifice with bridging carbonate and hydroxyl groups; Ni–O range between 2.022(5)–2.191(5)Å with O–Ni–O angles as small as 80.5(2)°. Columnar tunnels through the structure with a free pore diameter of ~5Å about the principal cell axis are occupied by arrays of sodium atoms with octahedral environments of bridging water molecules; Na–O are 2.312(8) and 2.321(8)Å with O–Na–O angles as small as 81.2(4)°.

Introduction

The description of kambaldaite, a new hydrated sodium/nickel basic carbonate mineral from Kambalda in Western Australia, has been presented in the preceding paper by Nickel and Robinson (1985). The present paper reports the determination of its crystal structure by single crystal X-ray diffraction methods.

Structure determination

Crystal data

$Na_2Ni_8(CO_3)_6(OH)_6 \cdot 6H_2O \equiv C_6H_{18}Na_2Ni_8O_{30}$, $M = 1085.7$. Hexagonal, space group $P6_3$ (C_6^6, No. 173), $a = 10.340(3)$, $c = 6.097(2)$Å, $U = 564.6(3)$Å^3. D_c ($Z = 1$) = 3.19 g cm^{-3}. $F(000) = 540$. $\mu_{Mo} = 66.6$ cm^{-1}.

Experimental details

A hexagonal prism ~0.1 mm thick and ~0.1 mm in length was mounted on a Syntex $P2_1$ four-circle diffractometer after examination by Weissenberg photographic methods. Cell parameters were obtained from 12 axial reflections with $2\theta \sim 40°$. A unique data set was measured at 295 K within the limit $2\theta_{max} = 100°$ using a conventional $2\theta/\theta$ scan mode, with a monochromatic Mo$K\alpha$ radiation source ($\lambda = 0.71069$Å). 2265 independent reflections were measured; of these 1157 with $I > 3\sigma(I)$ were used in the structure determination after the application of analytical absorption correction. The structure was solved by the heavy atom method, and refined by full matrix least squares using anisotropic thermal parameters for the non-hydrogen atoms. Hydrogen atoms were located in difference maps and refined in (x,y,z) with U(isotropic) constrained at estimated values. At convergence, residuals R,R' were 0.048, 0.051, reflection weights being $(\sigma^2(F_o) + 0.0005(F_o)^2)^{-1}$; for the alternative chirality R was 0.048. Na^+ excepted, neutral complex scattering factors were used (Ibers and Hamilton, 1974). Computation used the X-RAY program system (Stewart, 1976) implemented on a Perkin-Elmer 3240 computer. Observed and calculated structure factor amplitudes are given in Table 1;[1] atomic coordinates and thermal parameters are presented in Table 2. A projection of the structure down the c axis is shown in Figure 1, while a projection of the infinite $Na_2(H_2O)_6$ column along the non-unique axis is given in Figure 2.

Description of the structure

The structure determination suggests the $Na_2Ni_8(CO_3)_6(OH)_6 \cdot 6H_2O$ stoichiometry for kambaldaite. The deviation of the stoichiometry from this ideal composition suggested by the analysis reported in the previous paper (Nickel and Robinson, 1985) was explored during refinement by allowing the population of the most deviant element, sodium, to refine as an unconstrained variable. Since the population did not deviate significantly from one, it was restored and constrained at that value. Note, however, that the "impurity" element present in the greatest proportion is magnesium, and since this is isoelectronic with sodium, its presence replacing Na might be expected to have little effect on the refinement. In this case some disorder may be introduced into the structure which would probably be only reflected as higher than normal thermal parameters in consequence of different metal–oxygen distances. Some "streaking" of the reflections was evident in the profiles observed both in Weissenberg photographs and diffractometer data, and we note that the highest non-hydrogen atom thermal parame-

[1] To receive a copy of Table 1, order Document Am-85-257 from the Business Office, Mineralogical Society of America, 2000 Florida Avenue, N.W., Washington, D.C. 20009. Please remit $5.00 in advance for the microfiche.

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BETA1 S.F. AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

0, 0, L

4	830	824	8
6	251	229	12
8	762	763	10
10	315	296	15
12	378	375	16

0, 1, L

0	783	757	7
1	415	421	6
2	338	343	5
3	110	137	13
4	498	506	7
5	378	390	9
6	156	155	15
7	126	140	20
8	179	193	20
9	0	89	82
10	96	135	34
11	177	160	22
12	118	127	32
13	112	77	32

0, 2, L

0	13121309		9
1	634	619	7
2	11781209		12
3	239	231	8
4	10801098		11
5	250	251	11
6	762	768	8
7	219	221	14
8	486	492	11
9	93	101	31
10	336	319	15
11	0	12	86
12	219	258	22
13	53	49	47

0, 3, L

0	353	335	5
1	804	772	8
2	346	334	6
3	128	111	11
4	656	672	7
5	185	190	13
6	232	229	12
7	110	146	23
8	118	122	24
9	65	38	40
10	0	48	87
11	99	88	35
12	160	176	23

0, 4, L

0	902	896	8
1	402	393	6
2	13401350		12
3	540	544	7
4	840	868	9
5	371	380	9
6	691	700	9
7	132	100	19
8	361	367	13
9	142	127	22
10	321	313	15
11	104	139	32
12	282	259	16

0, 5, L

0	503	502	6
1	276	286	7
2	439	437	7
3	206	200	10
4	121	96	17
5	285	282	10
6	223	210	13
7	92	130	28
8	115	117	26
9	45	69	49
10	138	155	27
11	0	100	86
12	0	77	89

0, 6, L

0	12461272		12
1	189	189	10
2	972	985	10
3	173	173	14
4	354	353	9
5	0	28	64
6	454	465	10
7	103	102	24
8	461	464	12
9	68	93	40
10	390	406	15
11	30	26	63
12	179	195	23

0, 7, L

0	293	275	8
1	217	219	9
2	202	199	11
3	118	124	17
4	130	131	16
5	129	125	18
6	205	177	14
7	100	96	28
8	213	196	17
9	138	111	23
10	112	124	30
11	44	84	52
12	94	59	34

0, 8, L

0	599	603	8
1	187	165	10
2	624	625	8
3	469	465	9
4	560	593	9
5	249	227	12
6	464	447	11
7	58	85	39
8	280	278	15
9	149	128	24
10	274	257	17
11	117	99	29

0, 9, L

0	225	222	10
1	183	170	12
2	292	296	10
3	21	85	50
4	162	211	17
5	137	115	19
6	152	155	19
7	146	171	23
8	209	211	18
9	0	27	79
10	119	88	26
11	0	28	87

0, 10, L

0	556	550	9
1	162	189	14
2	479	458	9
3	204	207	15
4	381	396	12
5	110	125	25
6	314	304	13
7	54	76	40
8	229	243	18
9	86	98	36
10	165	172	23
11	37	64	56

0, 11, L

0	61	96	27
1	73	107	29
2	42	94	37
3	182	175	15
4	119	89	20
5	70	116	38
6	61	79	37
7	139	94	21
8	29	67	59
9	140	97	19
10	0	19	89

0, 12, L

0	516	524	11
1	0	52	69
2	361	371	12
3	25	44	50
4	94	132	29
5	53	51	39
6	225	190	15
7	0	33	80
8	303	300	15
9	71	58	38
10	233	215	18

0, 13, L

0	94	32	21
1	208	185	14
2	150	139	19
3	192	206	18
4	76	118	34
5	133	95	19
6	0	56	77
7	99	82	29
8	0	45	84
9	44	90	52

0, 14, L

0	216	231	16
1	53	76	38
2	163	165	19
3	0	83	77
4	296	313	15
5	43	66	48
6	138	158	24
7	131	97	24
8	136	156	26

0, 15, L

0	229	212	14
1	47	32	42
2	124	171	23
3	108	82	20
4	169	116	18
5	59	42	39
6	30	75	58
7	71	63	34
8	91	104	32

0, 16, L

0	0	76	78
1	0	51	73
2	188	192	19
3	54	66	45
4	173	153	19
5	77	69	35
6	194	160	17
7	137	87	20

0, 17, L

0	20	29	51
1	80	79	27
2	159	172	21
3	170	195	21
4	87	91	31
5	125	135	26
6	155	124	21

0, 18, L

0	199	174	17
1	95	82	28
2	84	119	31
3	0	35	76
4	0	45	77

0, 19, L

0	19	50	53
1	73	70	33
2	103	85	25

1, 0, L

0	808	757	7
1	424	421	6
2	349	343	5
3	141	137	10
4	510	506	7
5	381	390	9
6	150	155	16
7	147	140	17
8	212	193	15
9	51	89	48
10	132	135	26
11	156	160	24
12	157	127	24
13	101	77	33

1, 1, L

0	92	100	10
1	237	225	6
2	364	377	5
3	359	346	6
4	804	828	9
5	0	48	64
6	337	351	10
7	95	82	23
8	90	55	29
9	73	72	33
10	107	72	27
11	79	55	37
12	154	180	27
13	105	24	31

1, 2, L

0	183	208	7
1	471	466	5
2	397	401	6
3	556	561	7
4	417	402	7
5	307	300	9
6	409	404	9
7	193	191	14
8	319	328	14
9	134	119	23
10	135	145	25
11	150	110	23
12	0	70	90

1, 3, L

0	542	552	6
1	374	359	5
2	740	742	7
3	528	518	6
4	135	144	15
5	273	281	10
6	227	222	12
7	142	164	19
8	153	164	21
9	101	70	26
10	228	224	18
11	104	83	33
12	74	87	43

1, 4, L

0	17	14	33
1	506	492	6
2	441	445	6
3	312	306	8
4	564	577	8
5	97	122	21
6	277	275	11
7	0	29	71
8	103	107	25
9	99	76	27
10	119	90	27
11	83	82	39
12	178	158	22

1, 5, L

0	587	573	6
1	727	702	7
2	459	462	7
3	205	214	11
4	244	219	10
5	0	96	69
6	145	144	18
7	242	255	14
8	183	191	17
9	201	218	19
10	134	150	26
11	121	83	28
12	38	96	59

1, 6, L

0	275	277	8
1	651	651	7
2	558	548	7
3	297	309	9
4	165	152	14
5	137	163	17
6	279	290	13
7	187	200	17
8	111	117	26
9	234	252	18
10	170	184	22
11	90	116	39
12	71	54	39

1, 7, L

0	0	6	58
1	266	279	10
2	292	303	9
3	326	315	9
4	440	441	9
5	255	254	12
6	255	255	14
7	127	165	24
8	134	106	20
9	163	133	21
10	0	63	87
11	137	99	24
12	66	128	46

1, 8, L

0	354	348	8
1	89	99	18
2	304	308	10
3	509	513	9
4	278	267	11
5	393	408	11
6	112	140	26
7	169	198	20
8	231	215	17
9	78	103	39
10	95	94	31
11	98	137	35

1, 9, L

0	90	128	21
1	244	249	11
2	279	282	10
3	418	415	10
4	105	112	21
5	323	316	12
6	162	185	19
7	109	131	27
8	88	110	32
9	19	67	70
10	186	173	22
11	148	132	23

1, 10, L

0	44	45	33
1	323	318	10
2	276	285	12
3	280	283	12
4	466	469	11
5	214	223	16
6	202	196	16
7	205	191	18
8	113	103	28
9	196	147	17
10	112	15	25

1, 11, L

0	157	151	15
1	274	273	12
2	340	339	11
3	170	183	16
4	71	5	32
5	166	174	20
6	164	130	18
7	294	288	15
8	0	70	85
9	253	247	17
10	116	156	30

1, 12, L

0	266	262	13
1	338	355	12
2	131	177	22
3	215	212	16
4	184	197	16
5	123	160	25
6	131	105	23
7	153	182	23
8	221	200	18
9	248	246	17

1, 13, L

0	86	34	27
1	289	294	13
2	170	146	15
3	215	203	15
4	225	233	16
5	143	164	24
6	187	144	19
7	162	129	21
8	38	45	54
9	151	127	22

1, 14, L

0	252	262	15
1	250	252	14
2	81	90	30
3	248	263	15
4	0	153	88
5	288	291	15

BETA1 S.E. AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

1, 14, L

6	20	79	65
7	162	204	24
8	165	175	21

1, 15, L

0	149	184	22
1	149	141	22
2	129	131	25
3	209	214	17
4	86	61	28
5	212	245	19
6	87	83	35
7	133	121	25

1, 16, L

0	109	42	23
1	199	173	17
2	157	165	21
3	169	171	22
4	184	155	20
5	196	170	18
6	182	187	21

1, 17, L

0	166	134	18
1	189	184	19
2	68	67	39
3	169	145	18
4	117	73	22
5	71	92	37

1, 18, L

0	101	76	26
1	237	249	15
2	157	149	19
3	158	147	19

2, 0, L

0	13241309		9
1	639	619	7
2	11931209		13
3	226	231	8
4	10821098		11
5	250	251	11
6	747	768	9
7	232	221	13
8	509	492	11
9	0	101	81
10	309	319	17
11	99	12	28
12	275	258	19
13	0	49	94

2, 1, L

0	136	162	9
1	649	648	7
2	10571055		11
3	558	541	7
4	88	82	20
5	124	138	16
6	357	364	10
7	190	200	15
8	82	72	32
9	138	167	25
10	215	235	20
11	0	53	90
12	0	45	90

2, 2, L

0	14081466		12
1	425	392	5
2	13571395		14
3	111	108	14
4	486	476	8
5	131	166	17
6	638	636	9
7	68	108	33
8	566	592	12
9	83	46	32
10	417	434	15
11	74	61	41
12	173	162	25

2, 3, L

0	155	164	8
1	345	336	6
2	587	570	7
3	596	592	7
4	297	302	10
5	313	319	10
6	260	245	11
7	62	88	36
8	161	163	21
9	70	101	39
10	159	139	23
11	74	99	44
12	0	40	87

2, 4, L

0	13191305		10
1	261	254	8
2	10921069		10
3	382	367	8
4	687	682	8
5	180	174	13
6	512	520	10
7	39	108	50
8	324	310	14
9	158	131	21
10	264	274	18
11	90	86	35
12	253	271	20

2, 5, L

0	0	47	53
1	418	382	7
2	360	355	8
3	77	72	22
4	617	609	8
5	213	211	12
6	146	153	18
7	171	161	18
8	108	124	28
9	75	18	33
10	0	51	88
11	113	94	29
12	96	146	38

2, 6, L

0	764	745	7
1	206	189	11
2	514	520	8
3	179	183	12
4	816	820	9
5	49	58	34
6	452	445	11
7	153	200	22
8	441	437	13
9	129	138	29
10	180	193	23
11	50	66	52
12	228	227	20

2, 7, L

0	336	335	9
1	249	246	10
2	242	252	11
3	59	81	28
4	143	133	17
5	86	67	25
6	0	103	78
7	196	189	18
8	191	149	17
9	184	146	20
10	38	47	56
11	0	42	87

2, 8, L

0	821	825	9
1	37	66	35
2	554	543	9
3	56	63	30
4	257	253	12
5	35	19	43
6	355	320	13
7	0	20	78
8	390	398	14
9	0	18	81
10	289	282	18
11	0	18	92

2, 9, L

0	106	136	20
1	279	287	11
2	119	104	18
3	116	91	18
4	83	75	27
5	163	156	18
6	119	88	24
7	194	190	19
8	81	103	37
9	103	112	33
10	0	55	87
11	71	24	40

2, 10, L

0	369	373	10
1	143	142	16
2	371	370	11
3	133	120	17
4	396	394	12
5	103	117	24
6	254	274	16
7	99	110	29
8	172	209	21
9	0	102	86
10	128	142	26

2, 11, L

0	159	149	15
1	0	45	69
2	163	181	17
3	81	77	28
4	160	174	19
5	79	27	33
6	97	63	29
7	0	77	81
8	127	117	24
9	0	46	84
10	0	68	87

2, 12, L

0	240	232	13
1	130	98	18
2	253	251	13
3	77	153	36
4	281	291	15
5	56	77	41
6	233	216	16
7	140	102	22
8	105	129	33
9	0	72	82

2, 13, L

0	0	6	74
1	155	169	19
2	121	101	21
3	66	91	34
4	144	121	21
5	157	139	20
6	127	76	23
7	30	87	60
8	30	41	56

2, 14, L

0	376	381	14
1	76	5	27
2	172	178	20
3	83	3	28
4	0	72	82
5	106	9	23
6	147	139	22
7	54	11	42
8	214	199	17

2, 15, L

0	84	51	31
1	90	136	32
2	93	50	27
3	122	64	21
4	128	155	25
5	103	119	29
6	118	89	22
7	129	69	22

2, 16, L

0	124	98	23
1	153	124	18
2	38	127	55
3	63	58	36
4	144	151	23
5	107	85	26

2, 17, L

0	146	132	20
1	38	8	47
2	140	158	23
3	0	12	80
4	0	32	78

2, 18, L

0	0	6	74
1	136	105	22

3, 0, L

0	358	335	5
1	808	772	8
2	338	334	6
3	97	111	15
4	680	672	8
5	203	190	12
6	236	229	12
7	158	146	16
8	111	122	25
9	0	38	79
10	0	48	86
11	70	88	40
12	185	176	21

3, 1, L

0	815	807	8
1	264	274	6
2	634	638	7
3	171	165	10
4	311	312	9
5	121	135	17
6	202	196	13
7	243	234	13
8	253	237	15
9	225	226	16
10	129	125	26
11	108	114	31
12	44	93	55

3, 2, L

0	699	652	7
1	437	429	6
2	408	415	6
3	74	96	20
4	291	285	9
5	71	96	25
6	114	114	19
7	272	271	13
8	167	170	19
9	164	173	20
10	150	129	22
11	92	97	35
12	105	111	33

3, 3, L

0	342	338	6
1	377	373	6
2	561	554	6
3	302	307	9
4	625	631	8
5	248	257	11
6	373	379	10
7	160	165	19
8	71	94	36
9	173	145	18
10	114	106	28
11	83	82	41
12	128	146	29

3, 4, L

0	125	131	12
1	200	195	9
2	424	409	7
3	486	497	8
4	198	194	11
5	312	311	10
6	161	158	16
7	65	104	36
8	97	114	31
9	103	63	26
10	167	181	21
11	105	95	33
12	0	68	90

3, 5, L

0	365	373	8
1	230	227	9
2	355	355	8
3	502	508	8
4	417	400	9
5	354	368	10
6	158	164	17
7	185	188	17
8	275	265	14
9	35	16	51
10	19	101	68
11	135	175	28
12	94	70	32

3, 6, L

0	54	53	24
1	216	214	10
2	264	255	10
3	316	316	9
4	503	510	9
5	216	217	13
6	219	221	15
7	193	223	17
8	0	113	86
9	120	126	24
10	0	0	82
11	178	112	19

3, 7, L

0	264	251	9
1	603	602	8
2	355	363	10
3	209	194	12
4	111	65	19
5	124	85	18
6	248	267	15
7	315	314	14
8	135	125	21
9	233	230	18
10	225	179	17
11	152	161	24

3, 8, L

0	373	366	10
1	515	524	9
2	271	285	11
3	224	238	13
4	102	90	21
5	36	38	43
6	116	125	23
7	140	182	23
8	36	85	54
9	151	136	21
10	84	116	38
11	169	167	20

3, 9, L

0	60	72	26
1	303	337	12
2	213	218	13
3	289	301	12
4	309	303	12
5	218	220	16
6	293	282	14
7	170	186	20
8	0	11	81
9	138	138	23
10	119	73	26

3, 10, L

0	246	266	13
1	176	155	14
2	224	226	14
3	313	310	13
4	69	61	32
5	276	287	14
6	106	102	27
7	146	183	25
8	102	103	28
9	90	70	31
10	63	112	45

3, 11, L

0	178	205	18
1	207	188	14
2	182	177	16
3	339	353	13
4	91	116	29
5	316	320	13
6	68	136	39
7	143	174	25
8	181	184	21
9	0	73	85

3, 12, L

0	87	89	27
1	197	204	16
2	172	200	19
3	182	184	18
4	174	173	17
5	204	211	19

BETA1 S. F. AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

3, 12, L

6	269	214	15
7	118	162	29
8	92	67	34
9	145	145	24

3, 13, L

0	216	203	15
1	343	340	14
2	73	123	34
3	185	188	18
4	119	116	24
5	127	96	21
6	0	81	82
7	188	176	19
8	122	121	26

3, 14, L

0	165	177	22
1	319	316	15
2	48	54	46
3	162	147	18
4	116	145	26
5	67	48	36
6	0	59	82
7	175	169	20

3, 15, L

0	0	28	75
1	130	151	22
2	0	81	81
3	192	207	19
4	226	259	18
5	168	189	23
6	80	128	33

3, 16, L

0	119	158	24
1	0	90	81
2	125	119	23
3	206	216	18
4	89	78	29
5	183	186	17

3, 17, L

0	122	91	22
1	141	137	19
2	197	194	17
3	197	189	18

4, 0, L

0	890	896	8
1	392	393	6
2	13601	350	12
3	546	544	6
4	862	868	9
5	378	380	9
6	699	700	9
7	45	100	43
8	361	367	13
9	80	127	34
10	263	313	19
11	137	139	26
12	251	259	20

4, 1, L

0	804	782	8
1	289	294	7
2	413	411	6
3	165	155	11
4	527	538	8
5	130	117	15
6	501	529	10
7	122	116	21
8	84	66	30
9	101	73	29
10	0	80	88
11	109	60	28
12	74	90	41

4, 2, L

0	968	964	9
1	367	355	6
2	939	955	9
3	106	111	16
4	688	693	8
5	254	269	11
6	640	661	9
7	178	170	16
8	377	379	13
9	0	97	82
10	274	286	18
11	80	118	38
12	232	228	20

4, 3, L

0	349	346	7
1	595	592	7
2	276	269	9
3	288	297	9
4	308	317	10
5	172	174	14
6	50	84	37
7	104	124	26
8	146	136	21
9	142	107	22
10	0	89	87
11	142	120	27
12	63	83	46

4, 4, L

0	13301	302	13
1	126	134	14
2	671	677	8
3	23	26	43
4	397	387	9
5	14	76	56
6	394	393	11
7	74	88	32
8	565	578	12
9	95	27	28
10	316	314	16
11	0	12	85
12	173	167	23

4, 5, L

0	251	237	9
1	138	132	13
2	296	301	9
3	418	417	9
4	14	49	52
5	225	234	13
6	0	120	77
7	0	93	79
8	0	73	80
9	0	73	85
10	139	118	25
11	68	90	44

4, 6, L

0	526	518	8
1	226	224	10
2	623	604	8
3	70	25	24
4	503	522	10
5	117	128	20
6	392	409	12
7	149	153	20
8	236	234	17
9	87	98	34
10	206	218	22
11	0	54	84

4, 7, L

0	329	322	9
1	26	54	41
2	85	87	20
3	132	130	16
4	171	179	16
5	111	104	22
6	262	264	14
7	61	52	35
8	70	78	38
9	0	49	82
10	0	66	86
11	59	23	45

4, 8, L

0	234	239	12
1	220	202	12
2	491	503	10
3	43	89	40
4	330	323	12
5	190	219	18
6	408	412	12
7	86	96	31
8	135	142	25
9	105	59	31
10	176	208	24

4, 9, L

0	0	41	69
1	249	239	12
2	88	83	25
3	111	132	26
4	79	72	28
5	114	131	25
6	99	85	26
7	74	104	34
8	0	34	80
9	20	84	69
10	71	91	40

4, 10, L

0	375	370	11
1	125	133	21
2	322	333	13
3	114	119	21
4	120	114	22
5	59	57	36
6	205	228	19
7	62	68	38
8	298	278	15
9	0	43	87

4, 11, L

0	59	82	34
1	76	71	26
2	130	164	23
3	216	205	14
4	69	96	35
5	140	130	23
6	66	101	38
7	77	39	32
8	71	52	38
9	86	76	35

4, 12, L

0	127	122	21
1	55	76	39
2	183	193	18
3	116	129	23
4	186	212	19
5	156	128	19
6	229	227	17
7	95	70	31
8	116	132	28

4, 13, L

0	275	280	15
1	131	23	19
2	130	154	22
3	62	26	36
4	129	72	18
5	0	11	78
6	129	85	22
7	0	22	79

4, 14, L

0	180	178	19
1	123	102	22
2	49	66	38
3	0	81	82
4	207	214	19
5	55	104	43
6	38	95	52

4, 15, L

0	0	52	78
1	77	79	33
2	63	72	37
3	0	83	81
4	119	129	26
5	63	47	39

4, 16, L

0	206	209	17
1	67	39	34
2	67	146	40
3	0	39	75

5, 0, L

0	502	502	6
1	277	286	7
2	438	437	7
3	190	200	11
4	103	96	18
5	269	282	11
6	200	210	14
7	117	130	23
8	102	117	30
9	106	69	28
10	135	155	26
11	0	100	88
12	89	77	34

5, 1, L

0	507	506	6
1	285	283	7
2	392	401	7
3	381	382	8
4	231	218	10
5	490	496	9
6	240	236	13
7	265	250	13
8	182	174	18
9	121	144	28
10	213	168	18
11	0	92	90
12	83	110	40

5, 2, L

0	434	428	7
1	135	120	11
2	222	211	10
3	226	210	10
4	483	490	9
5	138	148	16
6	368	377	11
7	96	88	26
8	91	39	27
9	59	90	42
10	69	68	40
11	50	34	49
12	176	149	21

5, 3, L

0	380	363	7
1	611	609	7
2	145	164	14
3	274	260	9
4	377	362	9
5	117	113	19
6	196	191	15
7	242	255	15
8	252	268	15
9	233	247	18
10	132	138	25
11	38	139	59
12	137	106	25

5, 4, L

0	136	124	13
1	413	405	8
2	352	355	9
3	288	296	10
4	0	26	65
5	96	54	19
6	209	188	15
7	193	191	16
8	97	92	27
9	164	176	23
10	140	160	24
11	0	83	87

5, 5, L

0	154	154	13
1	239	242	10
2	250	255	11
3	319	333	10
4	420	452	11
5	316	297	11
6	192	204	16
7	325	326	13
8	77	77	34
9	152	161	25
10	0	81	91
11	159	148	23

5, 6, L

0	399	393	9
1	158	169	14
2	222	208	11
3	344	330	10
4	167	153	15
5	330	342	12
6	96	88	26
7	137	185	25
8	122	152	28
9	0	37	84
10	107	62	28
11	104	92	31

5, 7, L

0	384	385	10
1	215	196	12
2	258	258	12
3	373	371	11
4	176	169	16
5	415	415	12
6	79	115	33
7	187	195	19
8	126	155	26
9	161	108	22
10	129	128	27

5, 8, L

0	187	189	15
1	215	220	14
2	159	161	16
3	204	190	14
4	281	287	13
5	146	150	20
6	251	234	15
7	143	144	23
8	0	53	81
9	54	103	48
10	86	54	32

5, 9, L

0	235	220	12
1	413	419	11
2	248	234	13
3	224	238	16
4	154	130	18
5	164	145	17
6	145	162	22
7	213	187	17
8	164	154	22
9	245	247	18
10	119	125	29

5, 10, L

0	58	82	36
1	265	276	13
2	247	233	15
3	194	173	16
4	109	68	22
5	64	97	37
6	179	132	17
7	191	212	20
8	80	49	35
9	139	199	26

5, 11, L

0	64	21	30
1	213	206	15
2	204	196	16
3	234	237	16
4	284	289	15
5	216	221	17
6	218	177	18
7	217	235	21
8	111	92	28

5, 12, L

0	144	128	18
1	150	134	17
2	113	143	26
3	204	232	18
4	0	57	79
5	237	201	14
6	30	54	53
7	92	107	32
8	110	89	26

5, 13, L

0	162	155	19
1	127	120	23
2	159	175	22
3	284	287	15
4	54	96	44
5	249	250	16
6	86	103	32
7	190	179	17

5, 14, L

0	70	23	29
1	111	115	27
2	126	101	23
3	173	164	19

BETA1 S.F. AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

5, 14, L

4	155	185	23
5	162	143	21
6	98	87	25

5, 15, L

0	130	150	24
1	254	235	16
2	111	87	23
3	63	135	45
4	103	97	24

5, 16, L

0	148	145	19
1	130	149	22
2	85	65	28

6, 0, L

0	12521	272	12
1	181	189	10
2	982	985	10
3	196	173	11
4	352	353	9
5	70	28	24
6	468	465	10
7	95	102	26
8	458	464	12
9	58	93	45
10	424	406	13
11	67	26	40
12	194	195	23

6, 1, L

0	611	604	7
1	525	527	7
2	391	396	8
3	343	360	8
4	138	150	15
5	457	485	10
6	165	146	16
7	270	278	14
8	114	122	26
9	150	111	20
10	132	125	24
11	0	45	87
12	0	97	90

6, 2, L

0	735	735	8
1	300	300	8
2	569	584	8
3	106	106	17
4	720	745	8
5	133	167	17
6	464	470	11
7	173	152	15
8	380	386	13
9	117	104	26
10	186	189	23
11	0	72	88
12	221	235	21

6, 3, L

0	86	25	17
1	303	314	9
2	228	233	11
3	128	125	15
4	493	500	9
5	150	163	18
6	176	157	16
7	0	62	77
8	75	103	33
9	56	114	43
10	70	42	39
11	0	60	84

6, 4, L

0	508	497	8
1	119	137	15
2	705	716	8
3	217	223	11
4	495	500	10
5	136	120	18
6	404	405	11
7	114	104	24
8	205	207	19
9	42	115	54
10	247	230	18
11	97	76	32

6, 5, L

0	78	40	18
1	278	283	10
2	248	243	11
3	263	271	12
4	103	96	18
5	57	87	34
6	126	157	24
7	169	163	17
8	0	56	82
9	188	167	20
10	155	159	24
11	73	84	40

6, 6, L

0	725	747	9
1	85	61	21
2	464	491	10
3	15	45	54
4	177	175	16
5	37	46	44
6	189	210	19
7	0	26	74
8	323	357	16
9	0	14	83
10	250	253	18
11	37	29	51

6, 7, L

0	52	21	29
1	34	59	41
2	266	240	12
3	185	199	16
4	130	111	19
5	186	186	17
6	82	45	28
7	64	63	38
8	85	83	31
9	0	47	85
10	111	107	30

6, 8, L

0	224	222	14
1	178	175	15
2	327	334	12
3	81	88	28
4	227	274	17
5	0	40	74
6	284	308	16
7	127	129	23
8	86	166	38
9	145	143	24
10	141	147	23

6, 9, L

0	0	58	70
1	58	87	32
2	128	149	21
3	98	89	25
4	172	180	20
5	63	82	39
6	0	96	84
7	0	55	82
8	127	88	25
9	0	53	82

6, 10, L

0	247	238	14
1	99	142	26
2	279	282	14
3	135	120	22
4	225	225	16
5	139	116	24
6	178	152	17
7	160	108	20
8	0	80	83

6, 11, L

0	0	13	70
1	67	114	37
2	128	76	19
3	0	59	74
4	87	109	28
5	63	9	36
6	83	70	33
7	134	115	25
8	99	19	29

6, 12, L

0	195	201	17
1	92	73	28
2	218	251	18
3	73	66	33
4	71	53	35
5	0	80	85
6	119	152	26
7	0	71	82

6, 13, L

0	70	49	28
1	137	95	20
2	71	67	35
3	95	98	28
4	95	111	28
5	0	76	82
6	19	73	66

6, 14, L

0	103	48	26
1	133	131	22
2	74	146	37
3	67	138	38
4	116	123	28

6, 15, L

0	206	204	17
1	73	39	28
2	0	53	80

7, 0, L

0	256	275	9
1	208	219	10
2	188	199	12
3	121	124	15
4	107	131	19
5	127	125	18
6	188	177	14
7	0	96	80
8	189	196	19
9	87	111	34
10	143	124	23
11	77	84	41
12	76	59	37

7, 1, L

0	75	47	18
1	387	398	8
2	287	294	9
3	267	271	10
4	469	458	9
5	289	288	11
6	316	313	12
7	177	194	19
8	88	74	31
9	187	177	19
10	0	83	88
11	0	106	90
12	112	128	31

7, 2, L

0	179	170	11
1	74	94	21
2	388	384	9
3	210	212	11
4	139	101	15
5	182	174	13
6	119	132	23
7	104	116	25
8	139	89	23
9	92	85	32
10	0	108	86
11	30	97	63

7, 3, L

0	445	446	8
1	424	420	9
2	424	427	9
3	496	513	10
4	117	94	17
5	345	335	11
6	150	148	19
7	208	206	18
8	134	133	25
9	98	52	28
10	209	167	19
11	162	174	23

7, 4, L

0	82	65	18
1	230	249	12
2	186	186	12
3	59	93	30
4	241	259	13
5	199	157	14
6	149	133	18
7	111	75	24
8	36	114	57
9	151	95	21
10	114	39	23
11	73	74	39

7, 5, L

0	240	234	11
1	450	453	10
2	207	207	12
3	328	323	11
4	170	205	18
5	156	189	20
6	186	195	18
7	252	232	16
8	197	215	18
9	245	259	19
10	149	139	22

7, 6, L

0	144	131	15
1	274	280	13
2	105	111	20
3	138	164	20
4	140	171	22
5	128	102	20
6	0	43	78
7	137	130	23
8	154	136	21
9	155	193	25
10	0	39	86

7, 7, L

0	0	58	72
1	361	355	11
2	219	250	15
3	272	279	14
4	442	442	12
5	256	264	15
6	140	161	21
7	151	142	22
8	118	108	26
9	159	207	25
10	30	41	58

7, 8, L

0	0	18	71
1	147	133	18
2	150	156	20
3	266	242	12
4	0	19	76
5	228	216	15
6	112	115	25
7	88	111	30
8	157	48	18
9	0	21	82

7, 9, L

0	324	325	14
1	200	205	17
2	179	182	18
3	285	307	13
4	164	142	18
5	340	337	14
6	43	80	50
7	208	213	19
8	145	148	25
9	0	131	84

7, 10, L

0	66	61	32
1	136	145	21
2	92	104	28
3	140	160	23
4	146	125	20
5	0	123	84
6	112	142	26
7	98	99	29
8	83	54	31

7, 11, L

0	207	196	16
1	349	361	14
2	216	214	18
3	211	193	16
4	94	58	25
5	103	99	28
6	114	119	30
7	216	222	18

7, 12, L

0	0	48	73
1	176	203	20
2	49	74	43
3	54	103	46
4	50	47	42
5	116	65	25
6	111	95	25

7, 13, L

0	38	8	45
1	212	220	19
2	177	169	19
3	180	205	23
4	187	171	17
5	184	156	17

7, 14, L

0	89	121	30
1	0	72	78
2	80	78	31
3	144	146	22

8, 0, L

0	581	603	8
1	170	165	11
2	622	625	8
3	454	465	9
4	577	593	9
5	189	227	16
6	443	447	11
7	32	85	53
8	289	278	14
9	122	128	25
10	228	257	21
11	63	99	47

8, 1, L

0	339	346	9
1	425	440	9
2	279	256	9
3	350	347	10
4	238	248	12
5	221	206	13
6	115	107	21
7	170	158	18
8	171	208	21
9	216	237	17
10	63	71	41
11	100	135	34

8, 2, L

0	789	792	8
1	80	86	22
2	664	672	9
3	85	26	19
4	207	223	14
5	24	32	50
6	315	309	13
7	0	32	80
8	340	352	14
9	114	6	24
10	274	295	18
11	0	31	81

8, 3, L

0	151	133	14
1	141	122	14
2	256	235	11
3	251	249	12
4	113	76	18
5	306	269	12
6	156	172	19
7	89	135	33
8	113	107	27
9	44	27	48
10	103	94	31
11	109	100	28

8, 4, L

0	219	209	13
1	236	261	12
2	479	472	10
3	208	223	15
4	369	353	11

BETA1 - S.F. AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

8, 4, L

5	79	131	32
6	427	420	12
7	81	110	35
8	214	191	17
9	125	74	24
10	203	202	20

8, 5, L

0	114	140	19
1	63	74	30
2	189	183	14
3	144	144	19
4	211	190	14
5	151	150	20
6	162	140	19
7	146	162	22
8	147	124	21
9	0	89	82
10	131	54	24

8, 6, L

0	273	289	13
1	202	197	14
2	223	230	15
3	225	192	14
4	335	336	13
5	127	135	23
6	283	274	13
7	133	140	26
8	228	223	17
9	44	60	49
10	106	131	30

8, 7, L

0	86	61	27
1	196	215	17
2	102	69	24
3	124	123	23
4	50	45	40
5	19	72	63
6	138	93	20
7	92	104	30
8	90	79	30
9	127	145	25

8, 8, L

0	487	504	12
1	118	28	24
2	190	167	17
3	35	49	48
4	131	182	26
5	87	52	29
6	99	93	28
7	0	52	85
8	246	288	19
9	73	29	36

8, 9, L

0	98	109	27
1	67	55	32
2	90	98	26
3	170	129	16
4	0	17	78
5	203	211	18
6	50	116	47
7	38	55	51
8	54	47	41

8, 10, L

0	53	86	38
1	164	150	17
2	224	190	14
3	0	40	78
4	138	159	25
5	90	68	30
6	143	177	27
7	100	103	20

8, 11, L

0	97	154	31
1	0	71	80
2	71	85	36
3	0	86	81
4	30	38	54
5	98	44	27
6	100	85	28

8, 12, L

0	44	29	46
1	84	12	26
2	137	113	22
3	181	165	19
4	112	145	29
5	111	97	21

8, 13, L

0	68	24	35
1	90	86	30
2	119	107	23
3	0	36	79

9, 0, L

0	214	222	11
1	190	170	11
2	298	296	10
3	0	85	65
4	208	211	13
5	0	115	75
6	131	155	22
7	185	171	17
8	215	211	18
9	0	27	83
10	117	88	29
11	0	28	85

9, 1, L

0	268	276	10
1	485	477	9
2	307	314	11
3	287	289	11
4	165	159	16
5	138	138	21
6	116	133	24
7	303	280	13
8	177	147	20
9	227	242	18
10	148	165	27
11	77	134	38

9, 2, L

0	72	63	23
1	297	294	11
2	53	77	30
3	64	50	29
4	0	24	70
5	75	69	28
6	120	124	23
7	141	166	22
8	128	86	23
9	156	133	21
10	78	81	37
11	86	67	34

9, 3, L

0	58	78	28
1	326	330	11
2	243	249	12
3	282	295	12
4	285	306	13
5	262	272	15
6	312	325	14
7	199	218	20
8	0	22	80
9	203	184	19
10	98	79	32

9, 4, L

0	127	134	18
1	152	143	15
2	24	76	51
3	192	182	16
4	61	11	33
5	237	234	14
6	106	106	26
7	108	119	26
8	116	77	28
9	20	43	64
10	114	66	28

9, 5, L

0	127	113	20
1	199	226	16
2	313	300	13
3	323	347	13
4	106	86	27
5	352	356	14
6	225	250	18
7	199	213	20
8	151	117	18
9	113	114	30
10	133	168	27

9, 6, L

0	0	12	70
1	180	189	16
2	159	123	19
3	72	106	31
4	180	223	19
5	187	163	15
6	81	94	32
7	77	93	36
8	64	71	44
9	103	83	31

9, 7, L

0	341	349	14
1	379	378	13
2	154	171	21
3	225	247	15
4	143	161	20
5	162	158	19
6	97	66	29
7	206	204	19
8	162	163	23
9	203	230	21

9, 8, L

0	159	174	19
1	221	205	17
2	0	88	80
3	130	89	21
4	96	22	24
5	116	116	26
6	0	74	83
7	168	136	19
8	95	65	26

9, 9, L

0	100	130	30
1	249	255	15
2	179	172	19
3	193	232	20
4	150	198	25
5	184	204	21
6	311	299	16
7	205	184	18

9, 10, L

0	127	103	23
1	116	77	25
2	0	33	78
3	110	146	28
4	44	28	43
5	198	189	17
6	96	48	28

9, 11, L

0	96	145	32
1	173	168	19
2	140	167	26
3	244	253	16
4	0	76	82
5	252	258	18

9, 12, L

0	38	38	49
1	38	143	57
2	72	108	38
3	74	99	37
4	126	144	23

9, 13, L

0	177	170	18
1	235	223	16

10, 0, L

0	544	550	9
1	194	189	12
2	455	458	10
3	211	207	13
4	383	396	12
5	72	125	33
6	295	304	14
7	68	76	34
8	257	243	16
9	20	98	68
10	156	172	26
11	112	64	26

10, 1, L

0	53	52	29
1	292	285	11
2	169	164	15
3	224	225	13
4	379	378	12
5	197	197	17
6	179	180	19
7	150	134	22
8	0	31	84
9	104	116	33
10	31	72	61

10, 2, L

0	249	253	13
1	289	292	12
2	344	327	11
3	119	94	20
4	393	394	12
5	220	222	17
6	342	351	14
7	143	154	22
8	227	236	18
9	0	61	90
10	144	147	26

10, 3, L

0	317	305	12
1	310	313	12
2	94	106	26
3	206	190	14
4	0	81	78
5	0	22	79
6	125	108	23
7	169	200	22
8	115	116	30
9	178	171	21
10	55	61	42

10, 4, L

0	526	551	12
1	93	49	25
2	375	369	12
3	113	64	22
4	172	140	17
5	0	57	81
6	154	131	20
7	73	21	37
8	242	224	17
9	0	29	87

10, 5, L

0	140	175	21
1	170	141	18
2	117	104	22
3	218	216	16
4	75	72	32
5	172	180	21
6	0	74	82
7	165	146	23
8	88	108	34
9	124	34	23

10, 6, L

0	257	278	17
1	212	200	16
2	134	148	24
3	138	119	21
4	308	335	16
5	0	50	79
6	173	120	18
7	143	119	22
8	145	178	26

10, 7, L

0	70	116	34
1	144	146	20
2	77	104	32
3	69	99	34
4	147	135	21
5	87	112	32
6	125	82	23
7	109	71	25
8	106	64	27

10, 8, L

0	19	75	60
1	43	16	44
2	137	140	24
3	87	94	30
4	204	211	19
5	133	144	25
6	186	181	21
7	85	56	36

10, 9, L

0	0	16	72
1	128	164	26
2	68	63	35
3	0	61	81
4	75	97	37
5	124	74	24
6	99	64	28

10, 10, L

0	193	185	18
1	65	51	36
2	162	187	24
3	0	77	84
4	82	35	27
5	55	76	43

10, 11, L

0	114	122	26
1	51	32	35
2	119	57	26
3	118	135	27
4	120	94	25

10, 12, L

0	90	65	27
1	20	115	67

11, 0, L

0	106	96	18
1	108	107	21
2	61	94	31
3	194	175	15
4	95	89	23
5	101	116	27
6	55	79	38
7	112	94	24
8	0	67	81
9	20	97	69
10	75	19	36

11, 1, L

0	106	176	25
1	179	172	14
2	278	274	12
3	341	349	13
4	0	87	78
5	396	384	13
6	217	186	16
7	204	216	19
8	106	116	29
9	0	106	89
10	168	168	21

11, 2, L

0	248	251	14
1	130	82	17
2	93	55	22
3	70	88	31
4	137	140	23
5	116	61	23
6	185	169	19
7	59	51	41
8	0	66	81
9	98	38	31
10	91	81	35

11, 3, L

0	256	282	15
1	380	413	13
2	306	285	14
3	227	207	14
4	80	73	30
5	148	178	25
6	134	139	24
7	250	260	18
8	92	107	33
9	229	228	19

11, 4, L

0	99	120	25
1	133	123	21

BETA1 S. F. AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

11, 4, L

2	79	113	34
3	91	93	29
4	36	59	49
5	66	64	37
6	84	74	32
7	133	129	25
8	86	35	33
9	102	126	35

11, 5, L

0	63	99	38
1	274	261	14
2	200	188	17
3	286	277	14
4	279	282	16
5	245	238	16
6	125	149	27
7	206	231	21
8	89	79	33

11, 6, L

0	84	86	23
1	0	12	75
2	90	73	31
3	180	182	19
4	0	86	82
5	149	143	20
6	138	120	24
7	110	93	28
8	20	34	61

11, 7, L

0	207	234	20
1	215	201	17
2	95	152	33
3	342	308	14
4	102	116	30
5	284	281	18
6	89	94	31
7	201	210	20

11, 8, L

0	20	85	64
1	101	109	28
2	104	109	27
3	31	92	60
4	149	141	21
5	143	73	18
6	72	63	34

11, 9, L

0	125	139	26
1	255	287	18
2	169	162	20
3	189	170	18
4	82	89	34
5	137	128	21

11, 10, L

0	0	67	80
1	139	154	24
2	0	47	79
3	20	102	62
4	59	32	39

11, 11, L

0	0	49	76
1	130	166	24

12, 0, L

0	460	524	12
1	45	52	39
2	353	371	12
3	38	44	42
4	125	132	22
5	0	51	77
6	195	190	17
7	48	33	46
8	301	300	16
9	108	58	28
10	186	215	22

12, 1, L

0	189	170	14
1	107	89	19
2	94	83	26
3	255	294	15
4	105	99	25
5	287	281	14
6	103	109	28
7	49	159	53
8	188	149	18
9	0	41	81

12, 2, L

0	134	138	18
1	171	173	17
2	292	307	14
3	167	143	16
4	233	250	17
5	70	116	36
6	281	272	16
7	20	34	63
8	84	116	37
9	0	91	83

12, 3, L

0	140	144	19
1	167	176	18
2	128	151	22
3	141	175	20
4	180	152	17
5	68	110	37
6	149	163	21
7	111	109	26
8	59	86	43
9	70	74	38

12, 4, L

0	176	190	15
1	77	47	30
2	257	252	15
3	213	202	14
4	184	198	19
5	166	166	19
6	195	165	19
7	0	23	78
8	94	101	32

12, 5, L

0	135	149	20
1	177	228	20
2	67	86	34
3	176	152	18
4	0	4	78
5	0	36	74
6	20	61	59
7	163	158	21
8	0	56	77

12, 6, L

0	183	189	17
1	114	97	24
2	175	209	19
3	0	50	76
4	0	33	78
5	94	91	28
6	178	155	17
7	118	65	23

12, 7, L

0	0	19	72
1	49	91	42
2	138	93	19
3	160	177	21
4	80	84	31
5	191	156	19
6	0	33	77

12, 8, L

0	147	133	20
1	104	138	26
2	122	149	25
3	0	123	84
4	142	114	22
5	116	91	24

12, 9, L

0	163	138	18
1	54	80	39
2	94	114	29
3	94	86	27
4	75	70	32

12, 10, L

0	0	46	72
1	0	65	75

13, 0, L

0	65	32	29
1	195	185	14
2	114	139	23
3	204	206	15
4	128	118	20
5	104	95	24
6	0	56	81
7	66	82	43
8	20	45	66
9	70	90	38

13, 1, L

0	117	104	21
1	313	329	13
2	163	158	18
3	246	269	15
4	298	293	14
5	205	196	16
6	166	142	19
7	125	121	24
8	104	70	25
9	149	146	23

13, 2, L

0	0	6	72
1	75	111	30
2	116	81	21
3	157	159	19
4	123	96	20
5	97	125	30
6	112	51	24
7	0	93	84
8	0	55	83

13, 3, L

0	179	148	15
1	213	179	15
2	150	115	18
3	313	348	15
4	122	154	23
5	271	286	15
6	157	150	20
7	170	170	20
8	146	172	23

13, 4, L

0	194	204	19
1	76	98	32
2	111	124	23
3	81	68	30
4	66	71	36
5	0	23	79
6	122	95	24
7	54	22	39

13, 5, L

0	157	174	20
1	284	294	15
2	135	140	21
3	198	189	17
4	144	129	20
5	156	137	21
6	104	121	29
7	227	241	18

13, 6, L

0	76	4	30
1	134	131	21
2	54	75	42
3	0	67	84
4	124	79	23
5	73	13	31
6	0	49	80

13, 7, L

0	73	66	34
1	274	250	15
2	146	166	21
3	168	192	21
4	179	181	19
5	217	197	15

13, 8, L

0	0	57	72
1	0	74	81
2	91	55	24
3	143	148	22

13, 9, L

0	164	138	19
1	155	158	21

14, 0, L

0	261	231	12
1	124	76	20
2	148	165	19
3	0	83	78
4	310	313	14
5	0	66	76
6	167	158	18
7	129	97	21
8	145	156	23

14, 1, L

0	92	90	26
1	280	282	14
2	148	152	20
3	111	127	24
4	93	96	31
5	84	99	31
6	54	110	41
7	157	152	20
8	58	103	43

14, 2, L

0	257	231	13
1	133	106	20
2	268	260	14
3	0	48	76
4	0	24	77
5	85	98	29
6	165	189	21
7	99	79	26
8	171	187	21

14, 3, L

0	74	76	31
1	157	150	17
2	145	109	20
3	134	175	24
4	0	24	75
5	236	219	15
6	0	30	75
7	143	150	21

14, 4, L

0	72	97	33
1	122	136	23
2	90	114	28
3	0	26	80
4	147	161	23
5	30	28	55
6	123	157	27

14, 5, L

0	153	189	21
1	136	97	21
2	54	101	38
3	131	112	22
4	127	112	25
5	117	102	25
6	119	155	25

14, 6, L

0	89	12	24
1	83	73	31
2	97	135	30
3	142	128	20
4	62	97	38

14, 7, L

0	66	22	31
1	134	155	22
2	110	83	24
3	78	86	30

15, 0, L

0	213	212	15
1	51	32	38
2	152	171	18
3	0	82	77
4	97	116	30
5	66	42	34
6	66	75	39
7	0	63	79
8	0	104	85

15, 1, L

0	158	193	22
1	242	254	14
2	210	188	14
3	147	178	24
4	19	70	59
5	153	160	22
6	119	93	24
7	195	236	20

15, 2, L

0	89	81	24
1	147	159	20
2	65	71	34
3	75	61	28
4	103	107	26
5	91	56	27
6	0	42	78
7	90	86	31

15, 3, L

0	48	17	39
1	202	226	18
2	66	106	41
3	240	208	15
4	252	253	17
5	142	179	25
6	171	172	20

15, 4, L

0	58	52	33
1	76	74	30
2	108	72	23
3	66	66	35
4	0	71	78
5	152	134	18

15, 5, L

0	235	215	17
1	155	152	22
2	85	123	31
3	224	219	17
4	118	97	24

15, 6, L

0	139	146	21
1	90	77	27
2	0	71	79

16, 0, L

0	80	76	30
1	92	51	25
2	191	192	18
3	111	66	25
4	110	153	26
5	58	69	39
6	142	160	21
7	138	87	21

16, 1, L

0	102	41	22
1	180	142	14
2	98	130	30
3	158	138	19
4	145	148	20
5	179	165	19
6	125	114	22

16, 2, L

0	82	106	32
1	19	57	61
2	108	139	25
3	126	116	23
4	152	128	21
5	88	109	31

16, 3, L

0	49	106	43
1	223	232	17
2	108	75	22
3	85	87	30
4	72	3	26
5	29	28	52

BETA1 S.F.AMPLITUDES FOR KAMBALDAITE (10FO 10FC 10SIGMAF)

16,4,L

0	231	251	18
1	0	84	81
2	0	85	81
3	79	59	31

16,5,L

0	78	86	31
1	0	13	76
2	100	62	22

17,0,L

0	43	29	40
1	0	79	78
2	173	172	17
3	170	195	22
4	66	91	35
5	136	135	22
6	121	124	23

17,1,L

0	155	133	18
1	148	141	20
2	144	203	24
3	218	248	19
4	72	19	31
5	228	230	16

17,2,L

0	142	126	20
1	110	24	21
2	115	150	25
3	0	21	71
4	37	50	52

17,3,L

0	137	128	21
1	227	260	17
2	133	172	23
3	123	160	24

18,0,L

0	111	174	31
1	85	82	28
2	123	119	24
3	0	35	77
4	37	45	47

18,1,L

0	121	113	24
1	0	85	76
2	82	74	30
3	202	166	18

18,2,L

0	75	35	29
1	90	113	29

19,0,L

0	29	50	52
1	120	70	22
2	113	85	24