

[noprocess]

Rare Earth Elements in Chlorapatite [Ca₁₀(PO₄)₆(Cl)₂]:

Uptake, Site Preference and
Degradation of Monoclinic Structure

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Deposited Material

Table 5. List of observed and calculated structure factors

(a) *P*6₃/*m* structure of La-chlorapatite

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	0	2	100.1	106.0	-3	1	0	42.1	43.3	-5	4	7	0.0	6.0
0	0	4	186.1	198.3	-3	0	10	0.0	5.3	-5	4	6	0.0	14.5
0	0	6	98.0	98.7	-3	0	9	0.0	5.4	-5	4	5	0.0	0.7
0	0	8	79.4	73.3	-3	0	8	31.8	31.3	-5	4	4	47.3	47.7
0	0	10	0.0	39.9	-3	0	7	0.0	9.0	-5	4	3	17.2	18.5
-1	0	10	0.0	11.6	-3	0	6	12.1	12.1	-5	4	2	29.2	29.8
-1	0	9	0.0	2.6	-3	0	5	0.0	10.2	-5	4	1	0.0	3.6
-1	0	8	16.1	15.7	-3	0	4	73.7	73.9	-5	4	0	64.6	65.8
-1	0	7	0.0	5.4	-3	0	3	24.9	24.8	5	-3	10	0.0	1.8
-1	0	6	19.4	20.1	-3	0	2	40.1	39.4	-5	3	9	0.0	18.4
-1	0	5	0.0	7.5	-3	0	1	27.0	26.2	-5	3	8	22.5	22.1

-1	0	4	23.3	23.3	-3	0	0	158.3	153.8	-5	3	7	17.9	19.8
-1	0	3	0.0	4.0	-4	3	10	0.0	17.3	-5	3	6	0.0	5.7
-1	0	2	0.0	0.1	-4	3	9	0.0	12.4	-5	3	5	49.3	49.8
-1	0	1	15.8	15.9	-4	3	8	0.0	13.3	-5	3	4	38.2	38.7
-1	0	0	13.7	14.1	-4	3	7	24.9	24.8	-5	3	3	17.8	18.0
-2	1	10	0.0	28.3	-4	3	6	44.0	44.8	-5	3	2	14.1	14.0
-2	1	9	0.0	7.5	-4	3	5	26.7	26.3	-5	3	1	63.8	63.8
-2	1	8	0.0	0.4	-4	3	4	0.0	5.6	-5	3	0	59.8	58.7
-2	1	7	0.0	4.7	-4	3	3	39.3	39.4	5	-2	10	0.0	16.8
-2	1	6	61.8	61.3	-4	3	2	28.9	28.9	-5	2	9	0.0	16.7
-2	1	5	11.2	12.2	-4	3	1	42.9	43.2	-5	2	8	0.0	0.2
-2	1	4	0.0	7.2	-4	3	0	92.2	87.9	-5	2	7	25.6	26.1
-2	1	3	42.7	42.2	-4	2	10	0.0	24.5	-5	2	6	31.3	30.5
2	-1	2	0.0	111.8	-4	2	9	0.0	0.1	-5	2	5	28.3	28.8
-2	1	1	12.8	12.9	-4	2	8	0.0	4.4	-5	2	4	0.0	10.4
-2	1	0	0.0	0.3	-4	2	7	0.0	2.6	-5	2	3	52.4	52.7
-2	0	10	0.0	11.0	-4	2	6	47.1	47.5	-5	2	2	39.4	39.7
-2	0	9	0.0	1.4	-4	2	5	0.0	9.4	-5	2	1	51.7	51.7
-2	0	8	0.0	8.8	-4	2	4	0.0	0.1	-5	2	0	14.9	15.4
-2	0	7	0.0	1.5	-4	2	3	9.7	9.9	5	-1	10	0.0	4.7
-2	0	6	20.2	20.0	-4	2	2	116.8	115.4	-5	1	9	0.0	0.3
-2	0	5	19.3	20.2	-4	2	1	6.9	7.6	-5	1	8	0.0	18.0
-2	0	4	0.0	6.0	-4	2	0	17.5	18.4	-5	1	7	0.0	2.5
-2	0	3	26.8	26.0	-4	1	10	0.0	11.5	-5	1	6	0.0	10.9
-2	0	2	37.9	37.6	-4	1	9	0.0	13.9	-5	1	5	0.0	2.1
-2	0	1	22.9	22.6	-4	1	8	0.0	4.3	-5	1	4	49.9	50.2
-2	0	0	4.6	4.1	-4	1	7	0.0	7.2	-5	1	3	0.0	1.3
-3	2	10	0.0	6.8	-4	1	6	14.6	15.3	-5	1	2	35.7	35.7

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-3	2	9	0.0	20.6	-4	1	5	0.0	5.0	-5	1	1	0.0	2.4
-3	2	8	30.8	31.9	-4	1	4	0.0	4.8	-5	1	0	93.7	93.7
-3	2	7	34.1	34.2	-4	1	3	40.9	40.7	-5	0	9	0.0	2.2
-3	2	6	14.5	15.4	-4	1	2	38.0	37.8	-5	0	8	0.0	9.3
-3	2	5	38.1	37.7	-4	1	1	8.7	7.4	-5	0	7	0.0	3.3
-3	2	4	40.7	40.8	-4	1	0	18.9	18.6	-5	0	6	34.1	33.2
-3	2	3	64.9	65.1	4	0	10	0.0	22.3	-5	0	5	23.7	25.2
-3	2	2	50.9	49.4	-4	0	9	0.0	3.0	-5	0	4	18.8	18.4
-3	2	1	68.8	69.6	-4	0	8	0.0	6.2	-5	0	3	0.0	9.0
-3	2	0	0.0	0.7	-4	0	7	0.0	9.3	-5	0	2	53.3	53.0
-3	1	10	0.0	1.3	-4	0	6	38.7	38.1	-5	0	1	33.6	33.2
-3	1	9	30.7	33.6	-4	0	5	13.1	13.4	-5	0	0	14.3	13.7
-3	1	8	21.5	21.3	-4	0	4	13.4	14.4	-6	5	9	0.0	7.9
-3	1	7	36.7	36.3	-4	0	3	0.0	3.1	-6	5	8	0.0	17.8
-3	1	6	0.0	0.1	-4	0	2	51.8	52.3	-6	5	7	0.0	18.8
-3	1	5	58.9	58.7	-4	0	1	12.5	12.8	-6	5	6	0.0	15.0
-3	1	4	29.4	29.6	-4	0	0	27.9	28.1	-6	5	5	18.8	20.0
-3	1	3	81.9	81.6	-5	4	10	0.0	6.5	-6	5	4	12.9	12.0
-3	1	2	9.5	8.4	-5	4	9	0.0	5.2	-6	5	3	18.1	19.0
-3	1	1	97.7	98.2	-5	4	8	25.2	24.8	-6	5	2	0.0	0.7
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-6	5	1	29.4	29.7	-7	6	5	0.0	13.6	-7	0	6	25.8	26.1
-6	5	0	0.0	5.4	-7	6	4	40.9	40.8	-7	0	5	0.0	1.1
-6	4	10	0.0	4.9	-7	6	3	15.2	14.9	-7	0	4	0.0	13.2
-6	4	9	0.0	20.9	-7	6	2	33.8	34.3	-7	0	3	21.7	21.9
-6	4	8	33.4	33.0	-7	6	1	19.1	20.1	-7	0	2	35.2	35.7
-6	4	7	0.0	18.9	-7	6	0	27.6	28.1	-7	0	1	0.0	4.7
-6	4	6	0.0	15.4	-7	5	9	0.0	6.6	-7	0	0	17.1	17.5
-6	4	5	24.3	23.6	-7	5	8	0.0	7.6	8	-7	9	0.0	8.5

-6	4	4	48.7	48.2	-7	5	7	0.0	7.4	-8	7	8	32.7	31.5
-6	4	3	46.9	47.2	-7	5	6	21.4	22.1	-8	7	7	0.0	10.7
-6	4	2	38.1	38.1	-7	5	5	0.0	8.5	-8	7	6	0.0	4.8
-6	4	1	31.9	32.6	-7	5	4	0.0	5.7	-8	7	5	0.0	2.0
-6	4	0	58.0	57.4	-7	5	3	0.0	10.6	-8	7	4	53.7	52.4
-6	3	10	0.0	14.9	-7	5	2	82.2	82.0	-8	7	3	26.3	27.3
-6	3	9	0.0	9.6	-7	5	1	0.0	11.2	-8	7	2	0.0	4.3
-6	3	8	0.0	10.4	-7	5	0	47.9	47.6	-8	7	1	0.0	10.9
-6	3	7	0.0	18.1	-7	4	9	0.0	2.1	-8	7	0	66.7	64.6
-6	3	6	28.9	28.9	-7	4	8	0.0	13.2	-8	6	9	0.0	2.2
-6	3	5	29.0	29.0	-7	4	7	0.0	2.1	-8	6	8	0.0	21.9
-6	3	4	25.4	26.4	-7	4	6	42.6	41.7	-8	6	7	0.0	3.1
-6	3	3	16.2	15.1	-7	4	5	0.0	8.0	-8	6	6	0.0	1.9
-6	3	2	49.5	49.9	-7	4	4	29.1	29.5	-8	6	5	0.0	0.6
-6	3	1	39.2	39.6	-7	4	3	0.0	3.0	-8	6	4	27.6	28.1
-6	3	0	39.0	39.1	-7	4	2	61.2	61.4	-8	6	3	0.0	4.0
-6	2	10	0.0	0.7	-7	4	1	0.0	9.6	-8	6	2	0.0	13.6
-6	2	9	0.0	7.0	-7	4	0	41.8	42.5	-8	6	1	0.0	2.2
-6	2	8	38.8	37.9	-7	3	9	0.0	14.9	-8	6	0	17.1	16.3
-6	2	7	0.0	16.4	-7	3	8	0.0	13.3	-8	5	9	0.0	2.5
-6	2	6	0.0	4.9	-7	3	7	26.7	27.0	-8	5	8	0.0	13.3
-6	2	5	16.3	16.9	-7	3	6	0.0	9.5	-8	5	7	0.0	5.2
-6	2	4	44.8	44.0	-7	3	5	21.9	22.3	-8	5	6	41.1	40.8
-6	2	3	27.1	27.5	-7	3	4	17.9	19.7	-8	5	5	0.0	7.2
-6	2	2	49.5	49.3	-7	3	3	53.7	53.8	-8	5	4	26.7	26.4
-6	2	1	30.8	30.7	-7	3	2	0.0	1.3	-8	5	3	0.0	8.0
-6	2	0	10.8	9.7	-7	3	1	41.9	42.3	-8	5	2	52.7	52.1
-6	1	9	0.0	30.5	-7	3	0	16.5	15.6	-8	5	1	0.0	10.0

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-6	1	8	39.0	37.8	-7	2	9	0.0	15.6	-8	5	0	38.4	37.8
-6	1	7	33.6	33.7	-7	2	8	0.0	15.6	-8	4	9	0.0	4.5
-6	1	6	0.0	9.6	-7	2	7	20.9	21.9	-8	4	8	32.9	35.1
-6	1	5	52.8	52.9	-7	2	6	0.0	2.9	-8	4	7	0.0	12.8
-6	1	4	52.8	53.1	-7	2	5	20.6	21.3	-8	4	6	0.0	6.1
-6	1	3	58.8	59.0	-7	2	4	38.6	38.7	-8	4	5	25.0	26.0
-6	1	2	48.3	48.8	-7	2	3	38.4	37.9	-8	4	4	61.6	60.6
-6	1	1	72.6	71.9	-7	2	2	27.2	27.8	-8	4	3	0.0	8.7
-6	1	0	43.1	43.0	-7	2	1	33.1	33.8	-8	4	2	0.0	5.5
-6	0	9	0.0	9.9	-7	2	0	76.3	76.5	-8	4	1	33.0	34.1
-6	0	8	0.0	7.6	-7	1	9	0.0	1.7	-8	4	0	76.1	74.7
-6	0	7	0.0	15.2	-7	1	8	0.0	15.8	8	-3	9	0.0	3.2
-6	0	6	33.0	32.9	-7	1	7	0.0	5.1	-8	3	8	0.0	3.9
-6	0	5	0.0	7.3	-7	1	6	0.0	0.9	-8	3	7	0.0	10.7
-6	0	4	15.7	17.4	-7	1	5	0.0	7.4	-8	3	6	0.0	15.7
-6	0	3	27.8	28.0	-7	1	4	23.5	23.8	-8	3	5	0.0	3.1
-6	0	2	49.2	49.3	-7	1	3	0.0	4.9	-8	3	4	0.0	2.0
-6	0	1	14.0	13.6	-7	1	2	0.0	5.0	-8	3	3	17.2	19.6
-6	0	0	21.1	22.8	-7	1	1	0.0	9.0	-8	3	2	17.3	17.8
-7	6	9	0.0	9.7	-7	1	0	29.7	30.2	-8	3	1	0.0	10.4
-7	6	8	29.4	30.7	-7	0	9	0.0	6.3	-8	3	0	0.0	0.5
-7	6	7	0.0	5.3	-7	0	8	0.0	4.9	8	-2	9	0.0	2.4
-7	6	6	0.0	3.0	-7	0	7	0.0	8.2	-8	2	8	0.0	4.0
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-8	2	7	0.0	4.8	-9	5	3	0.0	16.7	-10	8	5	0.0	13.2
-8	2	6	0.0	12.4	-9	5	2	0.0	2.1	-10	8	4	0.0	6.4
-8	2	5	0.0	11.5	-9	5	1	26.0	26.4	-10	8	3	16.7	16.9
-8	2	4	0.0	2.8	-9	5	0	0.0	9.1	-10	8	2	49.3	46.6
-8	2	3	0.0	6.8	-9	4	8	0.0	16.0	-10	8	1	0.0	17.9

-8	2	2	16.2	18.2	-9	4	7	0.0	8.4	-10	8	0	23.5	25.9
-8	2	1	0.0	11.6	-9	4	6	0.0	17.5	-10	8	8	0.0	4.3
-8	2	0	0.0	5.5	-9	4	5	0.0	15.1	-10	7	8	0.0	6.2
8	-1	9	0.0	5.0	-9	4	4	0.0	8.0	-10	7	7	0.0	7.5
-8	1	8	0.0	8.1	-9	4	3	0.0	14.2	-10	7	6	0.0	20.3
-8	1	7	0.0	9.2	-9	4	2	0.0	3.3	-10	7	5	0.0	13.1
-8	1	6	0.0	12.1	-9	4	1	18.4	18.3	-10	7	4	0.0	2.5
-8	1	5	0.0	12.4	-9	4	0	0.0	14.7	-10	7	3	0.0	7.2
-8	1	4	24.9	24.6	-9	3	8	0.0	6.5	-10	7	2	0.0	10.5
-8	1	3	0.0	9.6	-9	3	7	34.0	35.1	-10	7	1	0.0	14.6
-8	1	2	40.4	41.4	-9	3	6	41.6	40.8	-10	7	0	17.8	16.2
-8	1	1	14.1	14.6	-9	3	5	46.0	44.9	-10	6	8	0.0	13.5
-8	1	0	47.7	46.0	-9	3	4	0.0	7.1	-10	6	7	0.0	3.5
-8	0	8	0.0	15.5	-9	3	3	46.8	46.6	-10	6	6	0.0	0.5
-8	0	7	0.0	2.8	-9	3	2	65.8	64.9	-10	6	5	0.0	4.7
-8	0	6	50.9	48.9	-9	3	1	60.8	60.6	-10	6	4	0.0	17.3
-8	0	5	0.0	3.3	-9	3	0	0.0	5.8	-10	6	3	0.0	1.0
-8	0	4	35.3	35.4	-9	2	8	0.0	18.6	-10	6	2	0.0	3.0
-8	0	3	0.0	5.0	-9	2	7	0.0	12.4	-10	6	1	0.0	1.6
-8	0	2	52.9	52.9	-9	2	6	0.0	0.8	-10	6	0	17.1	17.8
-8	0	1	0.0	1.0	-9	2	5	0.0	15.3	-10	5	8	0.0	1.4
-8	0	0	57.4	57.1	-9	2	4	0.0	21.0	-10	5	7	0.0	17.6
-9	8	8	0.0	9.4	-9	2	3	0.0	16.7	-10	5	6	0.0	11.3
-9	8	7	0.0	5.6	-9	2	2	0.0	9.9	-10	5	5	24.1	24.1
-9	8	6	0.0	2.4	-9	2	1	17.7	19.1	-10	5	4	0.0	13.3
-9	8	5	0.0	3.0	-9	2	0	13.5	15.1	-10	5	3	25.3	25.7
-9	8	4	0.0	13.2	-9	1	8	0.0	10.5	-10	5	2	40.4	40.2
-9	8	3	0.0	0.0	-9	1	7	0.0	6.4	-10	5	1	30.1	31.0

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-9	8	2	0.0	1.0	-9	1	6	0.0	24.9	-10	5	0	35.6	37.7
-9	8	1	0.0	7.3	-9	1	5	0.0	11.2	-10	4	8	0.0	8.9
-9	8	0	16.1	16.9	-9	1	4	0.0	3.6	-10	4	7	0.0	0.3
-9	7	8	0.0	20.4	-9	1	3	0.0	12.3	-10	4	6	0.0	17.9
-9	7	7	0.0	13.8	-9	1	2	0.0	3.0	-10	4	5	0.0	4.9
-9	7	6	0.0	6.0	-9	1	1	0.0	14.6	-10	4	4	0.0	5.0
-9	7	5	0.0	10.6	-9	1	0	20.3	22.2	-10	4	3	0.0	3.1
-9	7	4	27.1	25.5	-9	0	8	0.0	4.2	-10	4	2	0.0	6.4
-9	7	3	20.7	21.8	-9	0	7	0.0	17.0	-10	4	1	0.0	5.1
-9	7	2	16.0	15.8	-9	0	6	0.0	21.2	-10	4	0	0.0	10.2
-9	7	1	14.8	16.7	-9	0	5	0.0	15.5	-10	3	8	0.0	11.0
-9	7	0	25.1	25.5	-9	0	4	0.0	8.2	-10	3	7	0.0	13.8
-9	6	8	0.0	1.0	-9	0	3	28.4	28.5	-10	3	6	0.0	1.2
-9	6	7	0.0	8.8	-9	0	2	38.8	37.7	-10	3	5	0.0	2.8
-9	6	6	39.0	38.2	-9	0	1	24.3	24.0	-10	3	4	0.0	16.1
-9	6	5	20.0	20.9	-9	0	0	0.0	16.3	-10	3	3	23.6	25.3
-9	6	4	0.0	0.7	-10	9	7	0.0	10.4	-10	3	2	0.0	1.5
-9	6	3	0.0	0.3	-10	9	6	0.0	1.2	-10	3	1	0.0	9.7
-9	6	2	55.3	55.1	-10	9	5	0.0	9.3	-10	3	0	19.7	19.8
-9	6	1	19.2	21.6	-10	9	4	0.0	12.6	-10	2	8	0.0	13.5
-9	6	0	0.0	2.3	-10	9	3	19.8	20.6	-10	2	7	0.0	2.4
-9	5	8	0.0	12.7	-10	9	2	0.0	0.2	-10	2	6	0.0	6.5
-9	5	7	0.0	9.2	-10	9	1	0.0	12.3	-10	2	5	0.0	1.1
-9	5	6	0.0	7.1	-10	9	0	0.0	13.4	-10	2	4	24.8	25.8
-9	5	5	20.6	21.4	-10	8	7	0.0	9.7	-10	2	3	0.0	1.1
-9	5	4	0.0	13.6	-10	8	6	0.0	18.2	-10	2	2	0.0	17.0
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-10	2	1	0.0	0.3	-11	5	5	0.0	6.3	-12	9	4	0.0	20.6
-10	2	0	39.1	38.2	-11	5	4	0.0	7.8	-12	9	3	0.0	8.2

-10	1	7	0.0	18.9	-11	5	3	0.0	16.9	-12	9	2	0.0	12.9
-10	1	6	0.0	0.7	-11	5	2	0.0	6.0	-12	9	1	0.0	8.1
-10	1	5	0.0	13.2	-11	5	1	0.0	10.1	-12	9	0	28.5	28.6
-10	1	4	0.0	17.7	-11	5	0	0.0	2.2	-12	8	6	0.0	19.3
-10	1	3	29.7	29.1	-11	4	7	0.0	7.8	-12	8	5	0.0	20.9
-10	1	2	0.0	5.0	-11	4	6	0.0	5.1	-12	8	4	0.0	10.4
-10	1	1	0.0	21.2	-11	4	5	0.0	7.7	-12	8	3	0.0	11.3
-10	1	0	0.0	14.1	-11	4	4	29.3	29.4	-12	8	2	26.4	24.4
-10	0	7	0.0	1.2	-11	4	3	0.0	10.7	-12	8	1	22.0	22.0
-10	0	6	0.0	1.5	-11	4	2	0.0	9.8	-12	8	0	0.0	12.8
-10	0	5	0.0	5.7	-11	4	1	0.0	11.4	-12	7	6	0.0	7.4
-10	0	4	0.0	11.2	-11	4	0	38.8	36.0	-12	7	5	0.0	3.1
-10	0	3	0.0	5.9	-11	3	7	0.0	13.6	-12	7	4	0.0	5.0
-10	0	2	0.0	2.6	-11	3	6	0.0	12.7	-12	7	3	0.0	3.7
-10	0	1	0.0	4.1	-11	3	5	0.0	15.4	-12	7	2	0.0	2.2
-10	0	0	0.0	10.0	-11	3	4	0.0	0.6	-12	7	1	0.0	3.2
-11	10	6	0.0	1.1	-11	3	3	0.0	13.7	-12	7	0	0.0	1.6
-11	10	5	0.0	11.2	-11	3	2	0.0	6.7	-12	6	6	0.0	14.3
-11	10	4	29.9	29.5	-11	3	1	20.9	21.2	-12	6	5	0.0	13.2
-11	10	3	0.0	12.0	-11	3	0	0.0	5.7	-12	6	4	0.0	12.7
-11	10	2	0.0	5.1	-11	2	7	0.0	7.1	-12	6	3	0.0	10.3
-11	10	1	0.0	12.3	-11	2	6	0.0	3.8	-12	6	2	26.8	28.0
-11	10	0	39.5	39.2	-11	2	5	0.0	6.1	-12	6	1	0.0	15.3
-11	9	7	0.0	19.8	-11	2	4	0.0	18.3	-12	6	0	21.4	21.8
-11	9	6	0.0	0.9	-11	2	3	0.0	16.8	-12	5	6	0.0	7.4
-11	9	5	29.1	28.0	-11	2	2	0.0	7.9	-12	5	5	0.0	19.0
-11	9	4	0.0	19.5	-11	2	1	0.0	8.8	-12	5	4	0.0	3.4
-11	9	3	29.0	27.7	-11	2	0	0.0	19.3	-12	5	3	0.0	9.5

-11	9	2	0.0	10.4	-11	1	6	0.0	18.2	-12	5	2	0.0	8.3
-11	9	1	34.4	34.9	-11	1	5	0.0	23.1	-12	5	1	23.0	21.3
-11	9	0	0.0	13.4	-11	1	4	0.0	8.7	-12	5	0	0.0	4.7
-11	8	7	0.0	2.6	-11	1	3	34.3	33.5	-12	4	6	0.0	33.3
-11	8	6	0.0	26.8	-11	1	2	27.8	29.6	-12	4	5	0.0	2.6
-11	8	5	0.0	5.2	-11	1	1	30.4	30.8	-12	4	4	0.0	20.5
-11	8	4	0.0	5.8	-11	1	0	0.0	13.0	-12	4	3	0.0	6.7
-11	8	3	0.0	5.2	11	0	6	0.0	15.6	-12	4	2	27.1	28.4
-11	8	2	16.9	15.3	-11	0	5	0.0	15.3	-12	4	1	0.0	5.5
-11	8	1	0.0	5.6	-11	0	4	0.0	2.1	-12	4	0	37.2	35.6
-11	8	0	23.3	23.8	-11	0	3	0.0	17.5	-12	3	6	0.0	8.0
-11	7	7	0.0	3.0	-11	0	2	0.0	0.7	-12	3	5	0.0	11.4
-11	7	6	0.0	4.6	-11	0	1	0.0	18.8	-12	3	4	0.0	11.5
-11	7	5	0.0	7.6	-11	0	0	0.0	11.3	-12	3	3	0.0	12.2
-11	7	4	40.9	40.2	-12	11	5	0.0	8.7	-12	3	2	27.4	27.7
-11	7	3	0.0	0.5	-12	11	4	0.0	5.1	-12	3	1	0.0	14.3
-11	7	2	0.0	3.6	-12	11	3	0.0	8.2	-12	3	0	0.0	26.8
-11	7	1	0.0	7.7	-12	11	2	0.0	3.6	-12	2	5	0.0	12.6
-11	7	0	52.4	49.9	-12	11	1	0.0	9.2	-12	2	4	0.0	9.7
-11	6	7	0.0	19.7	-12	11	0	0.0	0.7	-12	2	3	0.0	17.5
-11	6	6	0.0	11.2	-12	10	6	0.0	8.2	-12	2	2	0.0	0.8
-11	6	5	26.8	27.2	-12	10	5	0.0	14.2	-12	2	1	0.0	18.0
-11	6	4	30.8	29.6	-12	10	4	0.0	20.7	-12	2	0	0.0	10.9
-11	6	3	0.0	20.1	-12	10	3	32.8	31.4	-12	2	6	0.0	1.1
-11	6	2	19.9	20.1	-12	10	2	0.0	11.8	-12	1	5	0.0	2.0
-11	6	1	32.4	32.1	-12	10	1	0.0	22.4	-12	1	4	0.0	17.2
-11	6	0	33.1	32.5	-12	10	0	0.0	23.9	-12	1	3	0.0	2.1
-11	5	7	0.0	8.6	-12	9	6	0.0	5.6	-12	1	2	0.0	27.4
-11	5	6	0.0	9.1	-12	9	5	0.0	5.4	-12	1	1	0.0	0.8

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-12	1	0	25.2	28.4	-13	6	0	0.0	15.3	-14	9	2	0.0	8.2
-12	0	4	0.0	22.7	-13	5	5	0.0	14.5	-14	9	1	28.5	30.2
-12	0	3	0.0	3.0	-13	5	4	0.0	23.6	-14	9	0	0.0	17.7
-12	0	2	0.0	5.5	-13	5	3	0.0	8.2	-14	8	4	0.0	13.3
-12	0	1	0.0	5.5	-13	5	2	0.0	5.7	-14	8	3	0.0	2.0
-12	0	0	35.5	36.4	-13	5	1	0.0	15.3	-14	8	2	0.0	6.6
-13	12	3	0.0	6.0	-13	5	0	28.4	30.6	-14	8	1	0.0	6.4
-13	12	2	0.0	20.7	13	-4	5	0.0	0.6	-14	8	0	0.0	7.7
-13	12	1	0.0	0.7	-13	4	4	0.0	2.1	-14	7	4	0.0	1.8
-13	12	0	0.0	13.9	-13	4	3	0.0	6.2	-14	7	3	0.0	13.6
-13	12	4	0.0	10.4	-13	4	2	0.0	10.9	-14	7	2	0.0	26.5
-13	11	4	0.0	2.1	-13	4	1	0.0	3.7	-14	7	1	0.0	18.2
-13	11	3	0.0	10.9	-13	4	0	0.0	14.5	-14	7	0	0.0	8.0
-13	11	2	0.0	31.5	-13	3	4	0.0	22.5	-14	6	3	0.0	15.2
-13	11	1	0.0	12.5	-13	3	3	0.0	8.3	-14	6	2	0.0	7.1
-13	11	0	0.0	1.6	-13	3	2	0.0	15.1	-14	6	1	0.0	22.8
-13	10	5	0.0	14.5	-13	3	1	0.0	6.2	-14	6	0	0.0	16.3
-13	10	4	0.0	0.8	-13	3	0	0.0	22.2	-14	6	4	0.0	14.1
-13	10	3	0.0	15.5	-13	3	5	0.0	4.5	-14	5	3	0.0	2.8
-13	10	2	0.0	5.6	-13	2	3	0.0	14.8	-14	5	2	0.0	15.9
-13	10	1	0.0	17.0	-13	2	2	0.0	12.4	-14	5	1	0.0	0.9
-13	10	0	0.0	8.9	-13	2	1	0.0	7.3	-14	5	0	0.0	20.5
-13	9	5	0.0	0.5	-13	2	0	0.0	18.9	-14	4	3	0.0	6.6
-13	9	4	0.0	2.3	-13	2	4	0.0	15.4	-14	4	2	0.0	22.4
-13	9	3	0.0	7.5	13	-1	3	0.0	14.0	-14	4	1	0.0	0.9
-13	9	2	0.0	11.1	-13	1	2	0.0	0.1	-14	4	0	0.0	4.8
-13	9	1	0.0	1.0	-13	1	1	0.0	9.6	-14	3	1	0.0	8.9

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-13	9	0	0.0	5.0	-13	1	0	0.0	6.1	-14	3	0	0.0	4.2
-13	8	5	0.0	0.2	13	0	2	0.0	0.4	-15	10	2	0.0	3.8
-13	8	4	0.0	6.6	-13	0	1	0.0	0.1	-15	10	1	0.0	1.7
-13	8	3	0.0	0.7	-13	0	0	0.0	6.3	-15	10	0	0.0	12.3
-13	8	2	0.0	26.7	14	-12	1	0.0	3.4	-15	9	2	0.0	6.2
-13	8	1	0.0	0.6	14	-12	0	0.0	10.6	-15	9	1	0.0	4.6
-13	8	0	0.0	12.1	-14	12	2	0.0	4.3	-15	9	0	0.0	22.8
-13	7	5	0.0	15.5	-14	11	3	0.0	1.1	-15	8	2	0.0	8.5
-13	7	4	0.0	2.2	-14	11	2	0.0	4.2	-15	8	1	0.0	7.4
-13	7	3	0.0	15.6	-14	11	1	0.0	3.7	-15	8	0	0.0	3.4
-13	7	2	0.0	7.4	-14	11	0	0.0	0.3	-15	7	2	0.0	25.5
-13	7	1	0.0	17.7	-14	10	4	0.0	3.3	-15	7	1	0.0	0.4
-13	7	0	0.0	19.2	-14	10	3	0.0	2.7	-15	7	0	0.0	19.3
-13	6	5	0.0	5.6	-14	10	2	0.0	26.3	-15	6	2	0.0	17.2
-13	6	4	0.0	17.2	-14	10	1	0.0	1.5	-15	6	1	0.0	11.1
-13	6	3	0.0	9.7	-14	10	0	0.0	12.5	-15	6	0	0.0	19.3
-13	6	2	0.0	9.9	-14	9	4	0.0	16.2	0	0	0	0.0	0.0
-13	6	1	0.0	9.1	-14	9	3	0.0	23.9	0	0	0	0.0	0.0

Rare Earth Elements in Chlorapatite [Ca₁₀(PO₄)₆(Cl)₂]:

Uptake, Site Preference and
Degradation of Monoclinic Structure
Michael E. Fleet, Xiaoayang Liu
and Yuanming Pan

Deposited Material

Table 5. List of observed and calculated structure factors

(b) *P6₃/m* structure of Nd-chlorapatite

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	0	2	104.1	105.3	-3	1	5	58.1	58.0	-4	0	5	13.5	13.1
0	0	4	204.3	200.3	-3	1	4	29.2	29.5	-4	0	4	14.1	15.1
0	0	6	95.2	95.2	-3	1	3	82.1	82.9	-4	0	3	0.0	3.2
0	0	8	77.8	74.5	-3	1	2	9.6	8.3	-4	0	2	54.8	54.5
0	0	10	35.5	36.5	-3	1	1	98.2	98.7	-4	0	1	12.5	12.7
-1	0	11	0.0	4.6	-3	1	0	44.9	44.9	-4	0	0	28.7	29.0
-1	0	10	0.0	10.6	-3	0	11	0.0	2.2	-5	4	9	0.0	4.9
-1	0	9	0.0	2.1	-3	0	10	0.0	2.9	-5	4	8	25.5	27.0
-1	0	8	0.0	14.2	-3	0	9	0.0	5.0	-5	4	7	0.0	6.4
-1	0	7	0.0	4.6	-3	0	8	33.1	32.9	-5	4	6	0.0	16.1
-1	0	6	18.4	19.1	-3	0	7	0.0	8.8	-5	4	5	0.0	0.7
-1	0	5	0.0	7.8	-3	0	6	0.0	9.2	-5	4	4	50.5	50.3
-1	0	4	22.3	22.5	-3	0	5	10.0	9.8	-5	4	3	17.6	18.4
-1	0	3	0.0	4.5	-3	0	4	75.1	75.2	-5	4	2	29.8	30.2

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-1	0	2	0.0	0.9	-3	0	3	24.3	24.3	-5	4	1	0.0	4.1
-1	0	1	15.7	15.8	-3	0	2	41.6	40.7	-5	4	0	68.7	68.9
-1	0	0	14.1	14.0	-3	0	1	26.5	25.9	-5	4	10	0.0	7.6
-2	1	11	0.0	1.1	-3	0	0	156.5	155.1	-5	3	9	0.0	17.4
-2	1	10	0.0	28.6	-4	3	11	0.0	11.3	-5	3	8	19.8	20.8
-2	1	9	0.0	7.0	4	-3	10	0.0	16.6	-5	3	7	19.7	19.8
-2	1	8	0.0	2.1	-4	3	9	0.0	12.0	-5	3	6	0.0	6.1
-2	1	7	0.0	4.5	-4	3	8	0.0	11.4	-5	3	5	48.7	48.9
-2	1	6	64.1	62.9	-4	3	7	24.2	23.5	-5	3	4	37.3	38.5
-2	1	5	10.8	11.5	-4	3	6	42.3	44.0	-5	3	3	19.0	19.5
-2	1	4	9.6	9.4	-4	3	5	26.2	25.9	-5	3	2	13.3	13.2
-2	1	3	42.9	42.4	-4	3	4	0.0	6.5	-5	3	1	63.7	64.2
-2	1	2	113.0	113.5	-4	3	3	38.2	38.3	-5	3	0	60.2	59.6
-2	1	1	12.5	12.3	-4	3	2	31.4	30.7	-5	3	10	0.0	1.8
-2	1	0	0.0	1.4	-4	3	1	42.1	42.6	-5	2	9	0.0	16.8
-2	0	11	0.0	2.5	-4	3	0	89.8	87.8	-5	2	8	0.0	0.9
-2	0	10	0.0	10.1	-4	2	11	0.0	2.8	-5	2	7	24.7	25.2
-2	0	9	0.0	0.9	-4	2	10	0.0	25.1	-5	2	6	29.4	28.9
-2	0	8	0.0	7.8	-4	2	9	0.0	0.0	-5	2	5	29.3	29.8
-2	0	7	0.0	1.4	-4	2	8	0.0	2.1	-5	2	4	0.0	9.6
-2	0	6	19.0	18.4	-4	2	7	0.0	3.1	-5	2	3	52.4	53.4
-2	0	5	18.1	19.1	-4	2	6	49.7	49.8	-5	2	2	39.1	40.2
-2	0	4	0.0	6.5	-4	2	5	0.0	9.7	-5	2	1	52.5	52.8
-2	0	3	26.3	25.9	-4	2	4	0.0	2.0	-5	2	0	13.8	13.0
-2	0	2	37.9	37.2	-4	2	3	9.4	8.9	-5	2	10	0.0	15.7
-2	0	1	21.9	21.6	-4	2	2	117.2	117.6	-5	1	10	0.0	6.2
-2	0	0	10.2	6.6	-4	2	1	0.0	8.9	-5	1	9	0.0	0.1
-3	2	11	0.0	16.8	-4	2	0	19.6	19.7	-5	1	8	0.0	20.0
-3	2	10	0.0	6.1	-4	1	11	0.0	3.3	-5	1	7	0.0	1.7

-3	2	9	0.0	20.4	-4	1	10	0.0	10.4	-5	1	6	0.0	13.8
-3	2	8	30.8	30.0	-4	1	9	0.0	12.6	-5	1	5	0.0	1.4
-3	2	7	32.8	33.2	-4	1	8	0.0	3.8	-5	1	4	51.6	52.3
-3	2	6	0.0	13.7	-4	1	7	0.0	7.3	-5	1	3	0.0	2.4
-3	2	5	38.5	38.2	-4	1	6	14.4	14.1	-5	1	2	37.1	37.6
-3	2	4	40.2	40.3	-4	1	5	0.0	5.5	-5	1	1	0.0	1.2
-3	2	3	64.5	65.0	-4	1	4	0.0	5.2	-5	1	0	95.1	94.3
-3	2	2	49.5	48.6	-4	1	3	40.6	40.2	-5	0	9	0.0	1.7
-3	2	1	69.5	70.2	-4	1	2	38.2	38.0	-5	0	8	0.0	9.8
-3	2	0	6.0	2.6	-4	1	1	8.7	7.7	-5	0	7	0.0	3.6
-3	1	11	0.0	15.9	-4	1	0	20.6	20.1	-5	0	6	32.6	32.5
-3	1	10	0.0	1.1	-4	0	10	0.0	20.8	-5	0	5	22.7	24.0
-3	1	9	32.6	32.2	-4	0	9	0.0	3.2	-5	0	4	19.1	18.9
-3	1	8	20.8	19.9	-4	0	8	0.0	7.0	-5	0	3	0.0	9.1
-3	1	7	36.4	36.3	-4	0	7	0.0	8.7	-5	0	2	54.4	54.6
-3	1	6	0.0	1.1	-4	0	6	39.2	37.6	-5	0	1	32.5	32.2
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-5	0	0	13.8	13.6	-6	0	6	34.0	34.8	-7	1	8	0.0	15.6
5	0	10	0.0	18.9	-6	0	5	0.0	6.6	-7	1	7	0.0	6.0
-6	5	9	0.0	7.7	-6	0	4	18.1	19.3	-7	1	6	0.0	2.0
-6	5	8	0.0	16.3	-6	0	3	25.8	26.2	-7	1	5	0.0	8.5
-6	5	7	0.0	17.8	-6	0	2	51.5	51.1	-7	1	4	24.3	25.0
-6	5	6	0.0	14.0	-6	0	1	13.0	12.9	-7	1	3	0.0	3.0
-6	5	5	18.4	20.2	-6	0	0	22.2	24.2	-7	1	2	0.0	5.1
-6	5	4	0.0	12.5	-7	6	9	0.0	9.2	-7	1	1	0.0	11.2
-6	5	3	19.0	18.9	-7	6	8	30.0	29.1	-7	1	0	31.0	33.0
-6	5	2	0.0	1.9	-7	6	7	0.0	6.1	-7	0	9	0.0	5.9
-6	5	1	29.6	30.0	-7	6	6	0.0	3.3	-7	0	8	0.0	4.7

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-6	5	0	0.0	2.5	-7	6	5	0.0	13.4	-7	0	7	0.0	7.7
6	-5	10	0.0	7.3	-7	6	4	40.5	41.3	-7	0	6	26.4	24.9
-6	4	9	0.0	19.9	-7	6	3	14.5	15.9	-7	0	5	0.0	0.9
-6	4	8	30.6	31.2	-7	6	2	32.1	32.9	-7	0	4	0.0	12.1
-6	4	7	0.0	18.6	-7	6	1	20.0	20.7	-7	0	3	19.4	21.1
-6	4	6	16.4	15.9	-7	6	0	29.2	30.0	-7	0	2	36.4	36.2
-6	4	5	23.3	23.3	7	-6	10	0.0	3.1	-7	0	1	0.0	4.4
-6	4	4	48.0	47.6	-7	5	9	0.0	6.9	-7	0	0	16.7	15.4
-6	4	3	46.7	47.5	-7	5	8	0.0	5.0	-8	7	8	32.2	33.0
-6	4	2	37.0	36.7	-7	5	7	0.0	8.1	-8	7	7	0.0	10.1
-6	4	1	32.1	32.8	-7	5	6	24.6	25.3	-8	7	6	0.0	2.6
-6	4	0	59.0	58.9	-7	5	5	0.0	9.7	-8	7	5	0.0	2.1
6	-4	10	0.0	4.7	-7	5	4	0.0	7.6	-8	7	4	55.4	54.3
-6	3	9	0.0	9.5	-7	5	3	0.0	12.1	-8	7	3	25.5	26.0
-6	3	8	0.0	12.4	-7	5	2	84.8	83.8	-8	7	2	0.0	3.0
-6	3	7	0.0	17.9	-7	5	1	0.0	13.0	-8	7	1	0.0	10.6
-6	3	6	31.0	31.3	-7	5	0	46.9	47.6	-8	7	0	68.2	66.9
-6	3	5	29.3	29.5	-7	4	9	0.0	1.5	8	-7	9	0.0	7.8
-6	3	4	27.6	27.5	-7	4	8	0.0	12.5	-8	6	9	0.0	1.2
-6	3	3	16.3	15.9	-7	4	7	0.0	2.2	-8	6	8	0.0	20.6
-6	3	2	51.3	52.4	-7	4	6	40.6	39.6	-8	6	7	0.0	2.9
-6	3	1	40.8	40.8	-7	4	5	0.0	8.2	-8	6	6	0.0	1.8
-6	3	0	39.8	39.7	-7	4	4	28.5	28.0	-8	6	5	0.0	0.3
6	-3	10	0.0	16.2	-7	4	3	0.0	2.2	-8	6	4	29.1	28.3
-6	2	9	0.0	6.5	-7	4	2	60.7	60.6	-8	6	3	0.0	4.1
-6	2	8	35.6	35.7	-7	4	1	0.0	10.0	-8	6	2	0.0	12.2
-6	2	7	0.0	15.0	-7	4	0	38.9	39.7	-8	6	1	0.0	2.7
-6	2	6	0.0	4.1	-7	3	9	0.0	14.5	-8	6	0	18.6	17.8
-6	2	5	15.5	16.2	-7	3	8	0.0	12.3	-8	5	9	0.0	2.7

-6	2	4	43.7	43.8	-7	3	7	26.2	26.4	-8	5	8	0.0	12.7
-6	2	3	25.7	26.1	-7	3	6	0.0	9.3	-8	5	7	0.0	4.3
-6	2	2	47.1	47.3	-7	3	5	22.3	22.4	-8	5	6	40.3	39.4
-6	2	1	29.5	29.6	-7	3	4	18.5	20.0	-8	5	5	0.0	6.8
-6	2	0	11.5	11.8	-7	3	3	52.8	52.8	-8	5	4	25.8	25.5
-6	1	9	0.0	29.0	-7	3	2	0.0	0.4	-8	5	3	0.0	7.5
-6	1	8	36.5	36.1	-7	3	1	41.8	42.4	-8	5	2	53.3	52.6
-6	1	7	33.4	33.2	-7	3	0	16.2	16.3	-8	5	1	0.0	8.9
-6	1	6	0.0	10.3	-7	2	9	0.0	15.0	-8	5	0	36.2	35.9
-6	1	5	52.8	51.8	-7	2	8	0.0	17.6	-8	4	9	0.0	4.3
-6	1	4	52.8	52.6	-7	2	7	21.7	21.7	-8	4	8	34.2	36.7
-6	1	3	59.5	59.3	-7	2	6	0.0	5.6	-8	4	7	0.0	12.2
-6	1	2	47.4	47.9	-7	2	5	21.4	21.9	-8	4	6	0.0	4.0
-6	1	1	71.9	71.5	-7	2	4	40.0	40.2	-8	4	5	25.4	24.8
-6	1	0	44.7	44.6	-7	2	3	37.7	38.0	-8	4	4	62.4	63.1
-6	0	10	0.0	17.7	-7	2	2	29.7	29.9	-8	4	3	0.0	8.1
-6	0	9	0.0	8.7	-7	2	1	33.3	34.9	-8	4	2	0.0	5.2
-6	0	8	0.0	9.8	-7	2	0	75.7	77.5	-8	4	1	32.4	32.8
-6	0	7	0.0	14.3	-7	1	9	0.0	1.1	-8	4	0	78.8	77.2
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-8	3	9	0.0	3.4	-9	6	5	20.1	21.1	-9	0	1	23.2	23.4
-8	3	8	0.0	2.5	-9	6	4	0.0	1.3	-9	0	0	17.9	18.8
-8	3	7	0.0	9.7	-9	6	3	0.0	2.1	-10	9	7	0.0	10.6
-8	3	6	0.0	16.1	-9	6	2	57.9	57.0	-10	9	6	0.0	1.4
-8	3	5	0.0	3.5	-9	6	1	21.5	22.7	-10	9	5	0.0	9.2
-8	3	4	0.0	1.0	-9	6	0	0.0	1.0	-10	9	4	0.0	13.6
-8	3	3	18.6	18.7	-9	5	9	0.0	9.3	-10	9	3	20.2	20.5
-8	3	2	20.2	20.5	-9	5	8	0.0	11.3	-10	9	2	0.0	0.9

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-8	3	1	0.0	10.2	-9	5	7	0.0	9.0	-10	9	1	0.0	12.9
-8	3	0	0.0	0.7	-9	5	6	0.0	7.5	-10	9	0	15.8	15.3
-8	2	8	0.0	3.5	-9	5	5	20.7	21.1	10	-9	8	0.0	9.8
-8	2	7	0.0	4.0	-9	5	4	0.0	13.3	-10	8	7	0.0	9.1
-8	2	6	0.0	12.0	-9	5	3	0.0	16.9	-10	8	6	0.0	20.9
-8	2	5	0.0	11.3	-9	5	2	0.0	0.8	-10	8	5	0.0	12.6
-8	2	4	0.0	3.6	-9	5	1	25.5	26.0	-10	8	4	0.0	8.1
-8	2	3	0.0	6.5	-9	5	0	0.0	9.9	-10	8	3	16.5	16.0
-8	2	2	18.3	19.1	-9	4	8	0.0	14.3	-10	8	2	48.3	47.8
-8	2	1	0.0	11.2	-9	4	7	0.0	8.3	-10	8	1	17.6	17.1
-8	2	0	0.0	7.4	-9	4	6	0.0	17.0	-10	8	0	26.2	26.0
-8	1	8	0.0	10.4	-9	4	5	0.0	14.7	10	-8	8	0.0	1.6
-8	1	7	0.0	8.7	-9	4	4	0.0	7.5	-10	7	8	0.0	6.4
-8	1	6	0.0	15.0	-9	4	3	0.0	14.4	-10	7	7	0.0	7.7
-8	1	5	0.0	11.4	-9	4	2	0.0	0.6	-10	7	6	0.0	18.4
-8	1	4	26.3	26.7	-9	4	1	18.1	18.1	-10	7	5	0.0	13.0
-8	1	3	0.0	8.8	-9	4	0	13.3	12.8	-10	7	4	0.0	1.1
-8	1	2	42.3	42.1	-9	3	8	0.0	3.5	-10	7	3	0.0	7.7
-8	1	1	14.1	13.9	-9	3	7	34.8	33.6	-10	7	2	0.0	10.8
-8	1	0	47.7	46.6	-9	3	6	42.5	42.0	-10	7	1	0.0	15.0
-8	0	8	0.0	15.5	-9	3	5	44.3	43.5	-10	7	0	15.5	12.5
-8	0	7	0.0	2.4	-9	3	4	0.0	3.6	-10	6	9	0.0	3.2
-8	0	6	50.6	47.8	-9	3	3	45.9	45.1	-10	6	8	0.0	13.3
-8	0	5	0.0	3.0	-9	3	2	67.0	65.4	-10	6	7	0.0	3.9
-8	0	4	35.5	35.4	-9	3	1	60.0	59.4	-10	6	6	0.0	0.9
-8	0	3	0.0	4.8	-9	3	0	0.0	3.0	-10	6	5	0.0	2.9
-8	0	2	54.5	54.5	-9	2	8	0.0	17.8	-10	6	4	0.0	18.7
-8	0	1	0.0	1.0	-9	2	7	0.0	12.9	-10	6	3	0.0	2.0
-8	0	0	57.5	55.6	-9	2	6	0.0	0.5	-10	6	2	0.0	2.7

-9	8	8	0.0	7.8	-9	2	5	0.0	15.9	-10	6	1	0.0	0.2
-9	8	7	0.0	5.1	-9	2	4	0.0	22.1	-10	6	0	19.2	20.2
-9	8	6	0.0	4.0	-9	2	3	18.7	17.8	-10	5	8	0.0	3.8
-9	8	5	0.0	2.6	-9	2	2	0.0	8.8	-10	5	7	0.0	16.9
-9	8	4	0.0	11.8	-9	2	1	20.2	20.5	-10	5	6	0.0	14.0
-9	8	3	0.0	1.0	-9	2	0	17.0	17.6	-10	5	5	23.4	23.8
-9	8	2	0.0	4.7	-9	1	7	0.0	6.0	-10	5	4	0.0	14.7
-9	8	1	0.0	6.5	-9	1	6	0.0	23.9	-10	5	3	25.7	25.7
-9	8	0	16.4	16.0	-9	1	5	0.0	10.5	-10	5	2	41.4	41.9
-9	7	8	0.0	18.9	-9	1	4	0.0	4.3	-10	5	1	29.6	31.0
-9	7	7	0.0	13.6	-9	1	3	0.0	11.6	-10	5	0	36.9	37.9
-9	7	6	0.0	5.8	-9	1	2	0.0	4.7	-10	4	8	0.0	9.1
-9	7	5	0.0	10.5	-9	1	1	0.0	13.9	-10	4	7	0.0	0.0
-9	7	4	26.2	25.7	-9	1	0	19.2	19.6	-10	4	6	0.0	16.3
-9	7	3	21.0	21.3	9	-1	8	0.0	9.7	-10	4	5	0.0	4.2
-9	7	2	13.8	13.8	-9	0	8	0.0	6.6	-10	4	4	0.0	6.4
-9	7	1	15.9	16.9	-9	0	7	0.0	15.8	-10	4	3	0.0	2.7
-9	7	0	26.6	27.4	-9	0	6	0.0	22.7	-10	4	2	0.0	6.5
9	-7	9	0.0	8.1	-9	0	5	0.0	15.1	-10	4	1	0.0	4.5
-9	6	8	0.0	1.2	-9	0	4	0.0	11.3	-10	4	0	0.0	6.8
-9	6	7	0.0	9.3	-9	0	3	28.0	27.0	-10	3	7	0.0	13.8
-9	6	6	39.7	40.2	-9	0	2	38.9	38.3	-10	3	6	0.0	1.7
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-10	3	5	0.0	4.2	-11	7	7	0.0	2.9	-11	1	1	32.2	31.1
-10	3	4	0.0	17.5	-11	7	6	0.0	1.8	-11	1	0	0.0	12.9
-10	3	3	23.4	25.4	-11	7	5	0.0	6.8	-11	0	7	0.0	8.3
-10	3	2	0.0	1.2	-11	7	4	41.9	41.7	-11	0	6	0.0	15.0
-10	3	1	0.0	11.2	-11	7	3	0.0	0.7	-11	0	5	0.0	14.0

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-10	3	0	22.5	22.4	-11	7	2	0.0	1.4	-11	0	4	0.0	2.6
10	-3	8	0.0	11.0	-11	7	1	0.0	7.1	-11	0	3	0.0	16.1
-10	2	7	0.0	1.3	-11	7	0	52.6	50.9	-11	0	2	0.0	3.1
-10	2	6	0.0	9.4	-11	6	8	0.0	18.5	-11	0	1	0.0	17.3
-10	2	5	0.0	0.7	-11	6	7	0.0	18.8	-11	0	0	0.0	8.8
-10	2	4	26.6	26.7	-11	6	6	0.0	10.3	-12	11	7	0.0	3.2
-10	2	3	0.0	2.0	-11	6	5	0.0	26.9	-12	11	6	0.0	8.9
-10	2	2	0.0	19.5	-11	6	4	30.6	29.6	-12	11	5	0.0	8.1
-10	2	1	0.0	0.5	-11	6	3	0.0	20.6	-12	11	4	0.0	4.4
-10	2	0	39.7	38.7	-11	6	2	0.0	17.8	-12	11	3	0.0	8.1
10	-2	8	0.0	15.0	-11	6	1	32.9	32.2	-12	11	2	0.0	6.4
-10	1	7	0.0	18.6	-11	6	0	33.0	33.3	-12	11	1	0.0	8.7
-10	1	6	0.0	0.9	-11	5	8	0.0	6.5	-12	11	0	0.0	1.1
-10	1	5	0.0	13.6	-11	5	7	0.0	9.1	-12	10	7	0.0	15.6
-10	1	4	0.0	18.3	-11	5	6	0.0	8.9	-12	10	6	0.0	7.2
-10	1	3	29.0	28.6	-11	5	5	0.0	7.6	-12	10	5	0.0	12.8
-10	1	2	0.0	3.6	-11	5	4	0.0	8.5	-12	10	4	0.0	21.0
-10	1	1	22.9	21.9	-11	5	3	0.0	17.5	-12	10	3	31.3	28.8
-10	1	0	0.0	15.8	-11	5	2	0.0	7.2	-12	10	2	0.0	9.7
-10	0	8	0.0	10.7	-11	5	1	0.0	11.7	-12	10	1	20.7	20.5
-10	0	7	0.0	0.4	-11	5	0	0.0	3.9	-12	10	0	23.8	24.9
-10	0	6	0.0	0.7	-11	4	7	0.0	8.2	-12	9	8	0.0	14.2
-10	0	5	0.0	5.5	-11	4	6	0.0	7.7	-12	9	7	0.0	4.7
-10	0	4	0.0	12.8	-11	4	5	0.0	7.7	-12	9	6	0.0	7.7
-10	0	3	0.0	5.1	-11	4	4	30.3	30.8	-12	9	5	0.0	5.9
-10	0	2	0.0	2.0	-11	4	3	0.0	10.7	-12	9	4	0.0	22.6
-10	0	1	0.0	4.4	-11	4	2	0.0	11.6	-12	9	3	0.0	8.3
-10	0	0	0.0	13.2	-11	4	1	0.0	11.9	-12	9	2	0.0	14.1
-11	10	7	0.0	7.2	-11	4	0	37.6	36.8	-12	9	1	0.0	8.3

-11	10	6	0.0	4.0	11	-4	8	0.0	19.3	-12	9	0	31.4	30.1
-11	10	5	0.0	11.0	-11	3	7	0.0	12.7	-12	8	8	0.0	7.0
-11	10	4	27.6	30.8	-11	3	6	0.0	12.7	-12	8	7	0.0	7.4
-11	10	3	0.0	12.2	-11	3	5	0.0	14.7	-12	8	6	0.0	19.9
-11	10	2	0.0	7.6	-11	3	4	0.0	0.6	-12	8	5	0.0	19.7
-11	10	1	0.0	12.6	-11	3	3	0.0	13.1	-12	8	4	0.0	10.3
-11	10	0	41.2	39.7	-11	3	2	0.0	9.3	-12	8	3	0.0	11.3
-11	9	7	0.0	19.6	-11	3	1	0.0	20.3	-12	8	2	25.5	26.7
-11	9	6	0.0	0.6	-11	3	0	0.0	4.3	-12	8	1	0.0	20.9
-11	9	5	0.0	27.7	11	-3	8	0.0	4.3	-12	8	0	0.0	12.1
-11	9	4	0.0	20.9	-11	2	7	0.0	7.1	-12	7	8	0.0	5.8
-11	9	3	27.6	28.2	-11	2	6	0.0	2.9	-12	7	7	0.0	0.2
-11	9	2	0.0	9.6	-11	2	5	0.0	6.6	-12	7	6	0.0	8.3
-11	9	1	35.6	35.0	-11	2	4	0.0	17.8	-12	7	5	0.0	3.0
-11	9	0	0.0	16.0	-11	2	3	0.0	16.9	-12	7	4	0.0	4.7
-11	8	8	0.0	1.1	-11	2	2	0.0	5.7	-12	7	3	0.0	3.3
-11	8	7	0.0	2.6	-11	2	1	0.0	9.4	-12	7	2	0.0	5.5
-11	8	6	0.0	25.6	-11	2	0	17.5	19.8	-12	7	1	0.0	3.2
-11	8	5	0.0	5.3	11	-2	8	0.0	12.4	-12	7	0	0.0	2.4
-11	8	4	0.0	5.0	-11	1	7	0.0	19.0	-12	6	7	0.0	7.9
-11	8	3	0.0	5.1	-11	1	6	0.0	20.8	-12	6	6	0.0	16.8
-11	8	2	0.0	16.7	-11	1	5	0.0	23.0	-12	6	5	0.0	11.8
-11	8	1	0.0	5.8	-11	1	4	0.0	9.6	-12	6	4	0.0	14.6
-11	8	0	23.0	21.3	-11	1	3	32.9	33.4	-12	6	3	0.0	9.3
-11	7	8	0.0	25.6	-11	1	2	32.0	31.8	-12	6	2	28.7	29.6
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-12	6	1	0.0	14.2	-13	11	3	0.0	11.9	-13	3	6	0.0	7.4
-12	6	0	19.8	22.3	-13	11	2	0.0	32.2	-13	3	5	0.0	5.2

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-12	5	7	0.0	9.7	-13	11	1	0.0	13.4	-13	3	4	0.0	22.8
-12	5	6	0.0	7.2	-13	11	0	0.0	0.4	-13	3	3	0.0	8.9
-12	5	5	0.0	18.2	-13	10	7	0.0	9.7	-13	3	2	0.0	13.4
-12	5	4	0.0	4.6	-13	10	6	0.0	10.2	-13	3	1	0.0	7.0
-12	5	3	0.0	9.3	-13	10	5	0.0	14.3	-13	3	0	0.0	23.8
-12	5	2	0.0	9.2	-13	10	4	0.0	1.3	13	-3	7	0.0	6.5
-12	5	1	20.3	20.6	-13	10	3	0.0	15.4	-13	2	6	0.0	10.6
-12	5	0	0.0	6.6	-13	10	2	0.0	6.2	-13	2	4	0.0	16.7
-12	4	7	0.0	4.0	-13	10	1	0.0	17.1	-13	2	3	0.0	15.5
-12	4	6	34.8	32.9	-13	10	0	0.0	4.8	-13	2	2	0.0	14.2
-12	4	5	0.0	2.3	-13	9	7	0.0	0.4	-13	2	1	0.0	8.8
-12	4	4	0.0	19.9	-13	9	6	0.0	10.4	-13	2	0	0.0	19.7
-12	4	3	0.0	6.0	-13	9	5	0.0	0.3	13	-2	5	0.0	5.6
-12	4	2	31.0	31.0	-13	9	4	0.0	1.3	-13	1	6	0.0	3.7
-12	4	1	0.0	4.7	-13	9	3	0.0	6.2	-13	1	4	0.0	8.4
-12	4	0	35.7	33.7	-13	9	2	0.0	12.1	-13	1	3	0.0	12.3
-12	3	7	0.0	8.1	-13	9	1	0.0	0.0	-13	1	2	0.0	1.6
-12	3	6	0.0	9.8	-13	9	0	0.0	2.9	-13	1	1	0.0	8.5
-12	3	5	0.0	10.7	-13	8	7	0.0	0.4	-13	1	0	0.0	7.1
-12	3	4	0.0	14.9	-13	8	6	0.0	15.7	13	-1	5	0.0	4.4
-12	3	3	0.0	11.5	-13	8	5	0.0	0.3	-13	0	3	0.0	2.8
-12	3	2	28.5	27.7	-13	8	4	0.0	9.6	-13	0	2	0.0	2.0
-12	3	1	0.0	13.8	-13	8	3	0.0	0.6	-13	0	1	0.0	0.5
-12	3	0	29.1	28.7	-13	8	2	26.5	26.6	-13	0	0	0.0	7.2
-12	2	7	0.0	11.2	-13	8	1	0.0	0.8	13	0	4	0.0	7.3
-12	2	6	0.0	1.5	-13	8	0	0.0	14.9	13	0	5	0.0	0.1
-12	2	5	0.0	11.9	-13	7	7	0.0	10.5	-14	13	1	0.0	13.2
-12	2	4	0.0	10.3	-13	7	6	0.0	17.9	-14	13	0	0.0	8.8
-12	2	3	0.0	16.1	-13	7	5	0.0	15.4	-14	13	2	0.0	23.5

-12	2	2	0.0	2.2	-13	7	4	0.0	1.1	-14	12	3	0.0	6.7
-12	2	1	0.0	17.1	-13	7	3	0.0	15.9	-14	12	2	0.0	2.7
-12	2	0	0.0	12.2	-13	7	2	0.0	8.9	-14	12	1	0.0	3.6
-12	1	7	0.0	1.9	-13	7	1	0.0	18.1	-14	12	0	0.0	11.8
-12	1	6	0.0	26.0	-13	7	0	0.0	15.9	-14	11	5	0.0	2.7
-12	1	5	0.0	1.8	-13	6	7	0.0	9.3	-14	11	4	0.0	9.7
-12	1	4	0.0	14.9	-13	6	5	0.0	6.6	-14	11	3	0.0	0.2
-12	1	3	0.0	2.3	-13	6	4	0.0	17.8	-14	11	2	0.0	2.8
-12	1	2	27.4	27.7	-13	6	3	0.0	10.4	-14	11	1	0.0	2.3
-12	1	1	0.0	0.4	-13	6	2	0.0	8.7	-14	11	0	0.0	2.5
-12	1	0	25.2	24.9	-13	6	1	0.0	10.3	-14	10	6	0.0	13.7
-12	0	6	0.0	3.4	-13	6	0	0.0	17.3	-14	10	5	0.0	1.0
-12	0	5	0.0	5.2	13	-6	6	0.0	2.6	-14	10	4	0.0	5.5
-12	0	4	0.0	25.2	-13	5	6	0.0	4.5	-14	10	3	0.0	1.8
-12	0	3	0.0	3.2	-13	5	5	0.0	12.4	-14	10	2	0.0	27.5
-12	0	2	0.0	6.0	-13	5	4	0.0	25.0	-14	10	1	0.0	0.8
-12	0	1	0.0	5.5	-13	5	3	0.0	6.7	-14	10	0	0.0	13.4
-12	0	0	34.0	38.0	-13	5	2	0.0	7.5	-14	9	6	0.0	4.8
-13	12	6	0.0	15.7	-13	5	1	0.0	12.9	-14	9	5	0.0	24.3
-13	12	5	0.0	0.5	-13	5	0	32.4	31.8	-14	9	4	0.0	16.8
-13	12	4	0.0	9.3	-13	4	6	0.0	17.8	-14	9	3	0.0	23.4
-13	12	3	0.0	5.3	-13	4	5	0.0	0.9	-14	9	2	0.0	6.8
-13	12	2	0.0	21.8	-13	4	4	0.0	1.5	-14	9	1	29.4	29.2
-13	12	1	0.0	0.7	-13	4	3	0.0	5.7	-14	9	0	0.0	18.9
-13	12	0	0.0	11.9	-13	4	2	0.0	12.7	-14	8	4	0.0	14.4
-13	11	6	0.0	23.2	-13	4	1	0.0	3.7	-14	8	3	0.0	2.6
-13	11	5	0.0	12.4	-13	4	0	0.0	12.6	-14	8	2	0.0	5.3
-13	11	4	0.0	0.3	13	-4	7	0.0	4.2	-14	8	1	0.0	6.8

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-14	8	0	0.0	10.0	-14	4	3	0.0	6.8	15-10	3	0.0	0.8	
14	-8	5	0.0	6.8	-14	4	2	0.0	23.8	-15	10	2	0.0	2.3
-14	7	5	0.0	15.3	-14	4	1	0.0	0.3	-15	10	1	0.0	2.8
-14	7	4	0.0	3.7	-14	4	0	0.0	6.3	-15	10	0	0.0	13.5
-14	7	3	0.0	13.9	-14	3	3	0.0	9.1	-15	9	3	0.0	1.4
-14	7	2	0.0	28.2	-14	3	2	0.0	1.1	-15	9	2	0.0	8.4
-14	7	1	0.0	17.8	-14	3	1	0.0	8.9	-15	9	1	0.0	6.2
-14	7	0	0.0	9.0	-14	3	0	0.0	7.2	-15	9	0	0.0	22.7
-14	6	4	0.0	15.0	14	-3	4	0.0	8.2	-15	8	3	0.0	0.4
-14	6	3	0.0	14.3	-14	2	2	0.0	6.7	-15	8	2	0.0	9.7
-14	6	2	0.0	5.7	-14	2	1	0.0	0.7	-15	8	1	0.0	6.7
-14	6	1	0.0	21.3	-14	2	0	0.0	9.0	-15	8	0	0.0	1.6
-14	6	0	0.0	18.1	14	-2	3	0.0	1.8	-15	7	3	0.0	2.2
14	-6	5	0.0	17.0	14	-2	5	0.0	0.1	-15	7	2	0.0	26.0
14	-6	6	0.0	4.2	14	-1	1	0.0	14.2	-15	7	1	0.0	0.6
-14	5	4	0.0	20.9	14	0	1	0.0	8.2	-15	7	0	0.0	16.5
-14	5	3	0.0	1.7	14	0	0	0.0	10.0	-15	6	2	0.0	18.3
-14	5	2	0.0	13.8	-15	12	0	0.0	25.9	-15	6	1	0.0	11.4
-14	5	1	0.0	0.2	-15	12	1	0.0	4.1	-15	6	0	0.0	19.5
-14	5	0	0.0	21.7	15-11	3	0.0	3.0	-15	5	1	0.0	2.7	
14	-5	5	0.0	1.6	15-11	2	0.0	10.8	-15	5	0	0.0	5.5	
-14	4	5	0.0	1.8	15-11	1	0.0	5.6	0	0	0	0.0	0.0	
-14	4	4	0.0	4.9	-15	11	0	0.0	6.2	0	0	0	0.0	0.0

Rare Earth Elements in Chlorapatite [Ca₁₀(PO₄)₆(Cl)₂]:

Uptake, Site Preference and
Degradation of Monoclinic Structure

Michael E. Fleet, Xioayang Liu
and Yuanming Pan

Deposited Material

Table 5. List of observed and calculated structure factors

(c) *P*6₃/*m* structure of Sm-chlorapatite

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	0	2	102.4	102.5	-3	1	5	59.7	59.3	-4	0	6	38.6	38.2
0	0	4	211.3	204.9	-3	1	4	29.3	29.2	-4	0	5	13.4	14.3
0	0	6	98.6	98.1	-3	1	3	83.1	82.6	-4	0	4	14.7	14.7
0	0	8	80.8	79.2	-3	1	2	10.2	9.2	-4	0	3	0.0	3.0
0	0	10	40.6	42.4	-3	1	1	97.5	98.3	-4	0	2	53.4	53.7
-1	0	11	0.0	5.1	-3	1	0	43.3	44.9	-4	0	1	12.9	13.3
-1	0	10	0.0	12.1	-3	0	11	0.0	2.6	-4	0	0	26.0	26.7
-1	0	9	0.0	2.4	-3	0	10	0.0	4.3	5	-4	11	0.0	0.6

-1	0	8	15.9	16.1	-3	0	9	0.0	5.7	-5	4	10	0.0	7.8
-1	0	7	0.0	4.7	-3	0	8	35.3	34.4	-5	4	9	0.0	5.7
-1	0	6	19.1	19.3	-3	0	7	0.0	9.5	-5	4	8	26.9	28.2
-1	0	5	0.0	8.1	-3	0	6	8.7	8.6	-5	4	7	0.0	6.6
-1	0	4	23.1	23.1	-3	0	5	9.8	10.4	-5	4	6	16.8	17.8
-1	0	3	5.1	4.6	-3	0	4	78.3	78.0	-5	4	5	0.0	0.9
-1	0	2	0.0	0.5	-3	0	3	25.2	25.1	-5	4	4	52.4	52.1
-1	0	1	16.1	16.2	-3	0	2	44.4	43.4	-5	4	3	18.6	19.1
-1	0	0	15.2	15.6	-3	0	1	27.0	26.4	-5	4	2	32.4	32.8
-2	1	11	0.0	1.5	-3	0	0	153.9	156.4	-5	4	1	0.0	4.1
-2	1	10	29.0	31.0	-4	3	11	0.0	13.0	-5	4	0	67.7	69.3
-2	1	9	0.0	7.5	-4	3	10	0.0	19.0	5	-3	11	0.0	16.7
-2	1	8	0.0	1.9	-4	3	9	0.0	13.6	-5	3	10	0.0	2.0
-2	1	7	0.0	4.6	-4	3	8	12.6	13.2	-5	3	9	0.0	18.8
-2	1	6	66.7	66.0	-4	3	7	24.7	25.2	-5	3	8	22.5	22.9
-2	1	5	12.3	12.8	-4	3	6	44.8	45.3	-5	3	7	20.3	20.7
-2	1	4	11.5	11.2	-4	3	5	27.9	27.4	-5	3	6	0.0	6.7
-2	1	3	42.9	42.2	-4	3	4	0.0	5.9	-5	3	5	50.3	50.5
-2	1	2	115.1	115.7	-4	3	3	39.5	39.4	-5	3	4	38.6	39.2
-2	1	1	12.7	13.0	-4	3	2	29.7	29.5	-5	3	3	18.7	18.7
-2	1	0	3.5	2.7	-4	3	1	43.0	43.7	-5	3	2	13.3	13.3
-2	0	11	0.0	3.3	-4	3	0	88.4	85.8	-5	3	1	64.0	64.3
-2	0	10	0.0	12.1	-4	2	11	0.0	2.8	-5	3	0	60.8	60.5
-2	0	9	0.0	1.0	-4	2	10	24.7	27.3	5	-2	11	0.0	14.7
-2	0	8	0.0	8.4	-4	2	9	0.0	0.4	-5	2	10	0.0	18.6
-2	0	7	0.0	1.0	-4	2	8	0.0	2.7	-5	2	9	0.0	18.1
-2	0	6	20.0	19.9	-4	2	7	0.0	2.6	-5	2	8	0.0	1.0
-2	0	5	19.6	20.1	-4	2	6	52.2	52.1	-5	2	7	24.8	26.3

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-2	0	4	0.0	5.3	-4	2	5	9.3	9.5	-5	2	6	31.8	31.0
-2	0	3	26.3	25.6	-4	2	4	0.0	3.7	-5	2	5	29.8	29.9
-2	0	2	38.8	38.5	-4	2	3	9.7	9.6	-5	2	4	11.3	11.2
-2	0	1	22.9	22.7	-4	2	2	120.3	119.0	-5	2	3	52.8	52.7
-2	0	0	6.0	5.3	-4	2	1	7.8	8.2	-5	2	2	40.7	40.8
-3	2	11	0.0	19.5	-4	2	0	20.5	21.7	-5	2	1	51.6	52.0
-3	2	10	0.0	7.2	-4	1	11	0.0	3.9	-5	2	0	14.1	14.3
-3	2	9	21.7	22.7	-4	1	10	0.0	12.3	5	-1	11	0.0	1.5
-3	2	8	32.8	33.2	-4	1	9	0.0	13.9	-5	1	10	0.0	5.4
-3	2	7	35.0	35.2	-4	1	8	0.0	4.1	-5	1	9	0.0	0.4
-3	2	6	14.0	14.5	-4	1	7	0.0	7.8	-5	1	8	19.4	21.2
-3	2	5	39.4	39.3	-4	1	6	14.6	14.9	-5	1	7	0.0	2.7
-3	2	4	41.1	40.9	-4	1	5	0.0	5.8	-5	1	6	14.6	13.9
-3	2	3	65.6	65.3	-4	1	4	0.0	4.5	-5	1	5	0.0	2.3
-3	2	2	50.6	49.4	-4	1	3	41.8	41.2	-5	1	4	54.7	55.2
-3	2	1	69.0	70.1	-4	1	2	38.9	39.0	-5	1	3	0.0	1.0
-3	2	0	0.0	2.4	-4	1	1	9.1	7.6	-5	1	2	38.5	38.9
-3	1	11	0.0	18.3	-4	1	0	20.2	19.9	-5	1	1	0.0	2.8
-3	1	10	0.0	2.1	4	0	11	0.0	8.3	-5	1	0	96.9	97.6
-3	1	9	34.5	35.0	-4	0	10	22.0	23.6	-5	0	10	21.5	21.4
-3	1	8	21.7	21.3	-4	0	9	0.0	3.7	-5	0	9	0.0	2.3
-3	1	7	37.7	38.0	-4	0	8	0.0	6.8	-5	0	8	0.0	10.2
-3	1	6	0.0	0.6	-4	0	7	0.0	9.0	-5	0	7	0.0	4.5
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-5	0	6	34.3	33.7	-6	1	2	48.5	48.6	-7	2	9	0.0	16.7
-5	0	5	24.7	25.7	-6	1	1	72.9	71.9	-7	2	8	18.9	18.8
-5	0	4	19.1	19.4	-6	1	0	44.6	44.8	-7	2	7	22.5	23.3
-5	0	3	7.8	8.4	-6	0	10	0.0	19.0	-7	2	6	0.0	5.5
-5	0	2	54.9	54.8	-6	0	9	0.0	10.7	-7	2	5	21.6	22.1

-5	0	1	33.8	33.5	-6	0	8	0.0	10.0	-7	2	4	43.9	42.8
-5	0	0	12.6	13.1	-6	0	7	16.6	16.5	-7	2	3	38.9	38.9
-6	5	10	0.0	8.8	-6	0	6	36.8	37.0	-7	2	2	30.5	30.5
-6	5	9	0.0	8.4	-6	0	5	0.0	7.9	-7	2	1	34.4	34.6
-6	5	8	17.8	18.4	-6	0	4	19.6	20.5	-7	2	0	79.5	79.8
-6	5	7	17.2	18.8	-6	0	3	28.9	29.2	-7	1	10	0.0	1.0
-6	5	6	13.5	14.9	-6	0	2	54.1	53.4	-7	1	9	0.0	1.6
-6	5	5	19.9	20.5	-6	0	1	14.4	14.7	-7	1	8	14.9	16.6
-6	5	4	11.7	11.8	-6	0	0	23.7	24.6	-7	1	7	0.0	5.2
-6	5	3	18.6	18.7	-7	6	10	0.0	3.2	-7	1	6	0.0	1.5
-6	5	2	0.0	1.5	-7	6	9	0.0	10.1	-7	1	5	0.0	8.1
-6	5	1	29.6	29.9	-7	6	8	31.8	32.4	-7	1	4	23.9	24.2
-6	5	0	0.0	4.2	-7	6	7	0.0	6.0	-7	1	3	0.0	4.7
-6	4	10	0.0	5.1	-7	6	6	0.0	4.0	-7	1	2	0.0	4.2
-6	4	9	20.7	21.6	-7	6	5	12.6	13.7	-7	1	1	9.5	9.8
-6	4	8	34.7	34.5	-7	6	4	42.5	42.2	-7	1	0	31.3	31.6
-6	4	7	19.6	19.7	-7	6	3	13.9	15.3	-7	0	10	0.0	18.3
-6	4	6	16.4	16.8	-7	6	2	33.6	34.2	-7	0	9	0.0	7.1
-6	4	5	24.1	23.7	-7	6	1	19.8	20.1	-7	0	8	0.0	5.3
-6	4	4	49.4	48.8	-7	6	0	30.0	30.5	-7	0	7	0.0	8.2
-6	4	3	47.6	47.9	-7	5	10	0.0	16.6	-7	0	6	26.6	26.5
-6	4	2	38.0	37.9	-7	5	9	0.0	7.0	-7	0	5	0.0	1.5
-6	4	1	32.0	32.7	-7	5	8	0.0	6.2	-7	0	4	13.2	13.6
-6	4	0	59.1	59.2	-7	5	7	0.0	7.7	-7	0	3	21.9	22.1
-6	3	10	0.0	17.2	-7	5	6	25.2	25.8	-7	0	2	36.9	37.0
-6	3	9	0.0	10.1	-7	5	5	0.0	8.7	-7	0	1	0.0	5.0
-6	3	8	0.0	12.6	-7	5	4	9.4	9.2	-7	0	0	16.1	16.5
-6	3	7	18.0	19.0	-7	5	3	10.8	10.6	-8	7	10	0.0	1.2

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-6	3	6	33.3	33.1	-7	5	2	86.1	85.7	-8	7	9	0.0	9.2
-6	3	5	30.8	29.8	-7	5	1	11.1	11.2	-8	7	8	35.2	35.0
-6	3	4	29.5	29.7	-7	5	0	50.1	50.6	-8	7	7	0.0	11.5
-6	3	3	16.2	15.7	-7	4	10	24.6	26.0	-8	7	6	0.0	2.2
-6	3	2	53.7	53.8	-7	4	9	0.0	1.8	-8	7	5	0.0	2.0
-6	3	1	40.0	40.4	-7	4	8	0.0	14.7	-8	7	4	57.6	56.4
-6	3	0	41.2	41.5	-7	4	7	0.0	1.7	-8	7	3	26.7	27.7
-6	2	10	0.0	1.0	-7	4	6	44.0	43.0	-8	7	2	0.0	1.9
-6	2	9	0.0	7.7	-7	4	5	0.0	8.5	-8	7	1	10.6	10.9
-6	2	8	40.5	39.6	-7	4	4	30.4	30.6	-8	7	0	69.4	67.8
-6	2	7	16.6	16.5	-7	4	3	0.0	3.4	-8	6	10	0.0	1.9
-6	2	6	0.0	4.2	-7	4	2	62.6	63.1	-8	6	9	0.0	1.3
-6	2	5	17.3	17.6	-7	4	1	9.6	9.6	-8	6	8	22.1	22.8
-6	2	4	45.3	44.7	-7	4	0	41.1	41.7	-8	6	7	0.0	3.5
-6	2	3	27.3	27.5	-7	3	10	0.0	6.2	-8	6	6	0.0	1.5
-6	2	2	49.2	49.2	-7	3	9	0.0	16.4	-8	6	5	0.0	0.4
-6	2	1	30.8	31.0	-7	3	8	14.1	14.2	-8	6	4	29.3	29.0
-6	2	0	11.9	11.6	-7	3	7	27.9	28.0	-8	6	3	0.0	4.7
-6	1	10	0.0	6.5	-7	3	6	0.0	8.6	-8	6	2	13.2	13.1
-6	1	9	30.2	32.1	-7	3	5	22.4	23.2	-8	6	1	0.0	3.1
-6	1	8	40.4	39.7	-7	3	4	20.5	20.8	-8	6	0	18.4	18.2
-6	1	7	35.3	35.4	-7	3	3	53.9	54.1	-8	5	10	0.0	23.7
-6	1	6	0.0	10.8	-7	3	2	0.0	0.9	-8	5	9	0.0	3.2
-6	1	5	54.4	53.8	-7	3	1	42.4	42.5	-8	5	8	0.0	14.5
-6	1	4	54.0	54.0	-7	3	0	17.6	18.0	-8	5	7	0.0	4.8
-6	1	3	60.3	59.6	-7	2	10	0.0	8.5	-8	5	6	43.4	42.4
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-8	5	5	0.0	7.8	-8	0	0	57.0	57.0	-9	3	8	0.0	5.4
-8	5	4	28.1	27.8	8	0	10	27.8	30.6	-9	3	7	36.9	37.5

-8	5	3	0.0	7.4	-9	8	10	0.0	4.1	-9	3	6	45.8	45.2
-8	5	2	54.7	54.6	-9	8	9	0.0	3.7	-9	3	5	47.6	46.7
-8	5	1	8.7	9.7	-9	8	8	0.0	10.0	-9	3	4	0.0	4.5
-8	5	0	38.6	38.0	-9	8	7	0.0	5.5	-9	3	3	49.4	48.3
-8	4	10	0.0	6.2	-9	8	6	0.0	2.2	-9	3	2	71.0	68.7
-8	4	9	0.0	5.2	-9	8	5	0.0	2.6	-9	3	1	63.1	62.1
-8	4	8	39.0	38.7	-9	8	4	12.3	13.6	-9	3	0	0.0	3.7
-8	4	7	0.0	13.9	-9	8	3	0.0	0.9	-9	2	9	0.0	10.8
-8	4	6	0.0	3.6	-9	8	2	0.0	1.9	-9	2	8	17.7	19.4
-8	4	5	26.6	26.9	-9	8	1	0.0	6.4	-9	2	7	0.0	13.4
-8	4	4	66.2	65.1	-9	8	0	17.4	18.3	-9	2	6	0.0	0.8
-8	4	3	8.8	9.0	-9	7	10	0.0	0.8	-9	2	5	14.7	15.7
-8	4	2	0.0	3.0	-9	7	9	0.0	10.0	-9	2	4	20.9	21.3
-8	4	1	33.8	34.5	-9	7	8	23.3	21.4	-9	2	3	18.0	17.6
-8	4	0	79.3	78.4	-9	7	7	0.0	14.8	-9	2	2	0.0	8.7
-8	3	10	0.0	11.3	-9	7	6	0.0	6.7	-9	2	1	19.3	19.9
-8	3	9	0.0	4.0	-9	7	5	0.0	11.8	-9	2	0	15.8	16.3
-8	3	8	0.0	3.9	-9	7	4	27.4	26.4	-9	1	9	0.0	7.1
-8	3	7	0.0	10.9	-9	7	3	22.5	22.9	-9	1	8	0.0	10.7
-8	3	6	14.5	15.6	-9	7	2	16.4	15.9	-9	1	7	0.0	6.7
-8	3	5	0.0	3.6	-9	7	1	17.6	17.9	-9	1	6	26.6	26.1
-8	3	4	0.0	2.2	-9	7	0	27.7	27.5	-9	1	5	0.0	10.8
-8	3	3	19.0	19.7	-9	6	10	0.0	22.1	-9	1	4	0.0	3.4
-8	3	2	18.1	18.4	-9	6	9	0.0	4.5	-9	1	3	10.8	12.2
-8	3	1	10.4	10.6	-9	6	8	0.0	0.6	-9	1	2	0.0	4.5
-8	3	0	0.0	1.2	-9	6	7	0.0	9.2	-9	1	1	13.9	14.2
-8	2	10	0.0	8.7	-9	6	6	42.0	42.4	-9	1	0	21.6	21.6
-8	2	9	0.0	2.5	-9	6	5	21.2	21.4	9	-1	10	0.0	12.8

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-8	2	8	0.0	3.8	-9	6	4	0.0	2.0	-9	0	9	0.0	12.5
-8	2	7	0.0	4.2	-9	6	3	0.0	0.3	-9	0	8	0.0	6.1
-8	2	6	12.8	12.7	-9	6	2	59.8	58.8	-9	0	7	18.7	18.4
-8	2	5	12.2	11.7	-9	6	1	20.8	21.8	-9	0	6	24.0	24.5
-8	2	4	0.0	2.7	-9	6	0	0.0	0.1	-9	0	5	15.3	16.6
-8	2	3	0.0	7.7	-9	5	10	0.0	7.0	-9	0	4	0.0	11.0
-8	2	2	18.7	19.4	-9	5	9	0.0	10.0	-9	0	3	30.3	30.0
-8	2	1	11.1	11.2	-9	5	8	0.0	13.2	-9	0	2	41.6	40.8
-8	2	0	7.2	6.7	-9	5	7	0.0	10.2	-9	0	1	25.5	25.4
-8	1	10	0.0	5.1	-9	5	6	0.0	7.1	-9	0	0	18.3	18.8
-8	1	9	0.0	5.4	-9	5	5	22.2	22.3	-10	9	9	0.0	14.1
-8	1	8	0.0	10.2	-9	5	4	13.7	14.0	-10	9	8	0.0	10.6
-8	1	7	0.0	10.0	-9	5	3	17.2	17.6	-10	9	7	0.0	11.6
-8	1	6	15.1	15.3	-9	5	2	0.0	1.3	-10	9	6	0.0	1.4
-8	1	5	13.1	13.0	-9	5	1	26.7	27.0	-10	9	5	0.0	9.8
-8	1	4	28.3	28.3	-9	5	0	9.6	10.6	-10	9	4	12.5	13.0
-8	1	3	10.0	10.4	-9	4	10	0.0	11.6	-10	9	3	21.7	21.7
-8	1	2	44.1	44.7	-9	4	9	0.0	9.0	-10	9	2	0.0	0.9
-8	1	1	15.6	15.4	-9	4	8	16.9	16.5	-10	9	1	13.2	13.1
-8	1	0	51.0	49.2	-9	4	7	0.0	8.9	-10	9	0	15.2	14.7
-8	0	9	0.0	0.3	-9	4	6	17.0	18.2	-10	8	9	0.0	8.1
-8	0	8	0.0	16.7	-9	4	5	14.8	15.1	-10	8	8	0.0	2.9
-8	0	7	0.0	2.6	-9	4	4	0.0	7.4	-10	8	7	0.0	10.7
-8	0	6	52.4	50.8	-9	4	3	14.0	14.4	-10	8	6	20.6	21.2
-8	0	5	0.0	3.1	-9	4	2	0.0	2.0	-10	8	5	0.0	14.2
-8	0	4	37.2	36.7	-9	4	1	18.3	18.3	-10	8	4	0.0	9.4
-8	0	3	0.0	4.8	-9	4	0	12.7	14.3	-10	8	3	17.6	17.8
-8	0	2	55.7	54.9	-9	3	10	0.0	24.0	-10	8	2	51.2	49.6
-8	0	1	0.0	0.9	-9	3	9	0.0	23.6	-10	8	1	19.2	18.7

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-10	8	0	28.0	28.7	-10	2	3	0.0	0.8	-11	7	3	0.0	0.5
-10	7	9	0.0	7.1	-10	2	2	18.4	19.4	-11	7	2	0.0	1.0
-10	7	8	0.0	6.6	-10	2	1	0.0	0.7	-11	7	1	0.0	7.7
-10	7	7	0.0	8.4	-10	2	0	41.6	41.1	-11	7	0	54.3	52.5
-10	7	6	21.3	21.0	-10	1	9	0.0	12.6	-11	6	9	0.0	11.3
-10	7	5	13.7	13.4	-10	1	8	0.0	13.7	-11	6	8	21.9	21.4
-10	7	4	0.0	2.9	-10	1	7	19.9	20.0	-11	6	7	21.1	21.0
-10	7	3	0.0	7.9	-10	1	6	0.0	0.7	-11	6	6	0.0	12.4
-10	7	2	11.2	11.8	-10	1	5	0.0	14.0	-11	6	5	29.8	29.3
-10	7	1	14.6	15.0	-10	1	4	18.8	18.5	-11	6	4	32.5	31.2
-10	7	0	15.6	15.7	-10	1	3	31.1	30.0	-11	6	3	21.3	21.8
-10	6	10	0.0	0.0	-10	1	2	0.0	4.2	-11	6	2	20.0	20.2
-10	6	9	0.0	4.6	-10	1	1	22.4	22.0	-11	6	1	35.3	34.3
-10	6	8	0.0	14.6	-10	1	0	15.6	15.4	-11	6	0	36.5	34.8
-10	6	7	0.0	3.2	-10	0	9	0.0	1.1	-11	5	9	0.0	9.9
-10	6	6	0.0	1.2	-10	0	8	0.0	11.8	-11	5	8	0.0	7.0
-10	6	5	0.0	5.0	-10	0	7	0.0	1.1	-11	5	7	0.0	9.5
-10	6	4	17.7	18.4	-10	0	6	0.0	1.1	-11	5	6	0.0	9.4
-10	6	3	0.0	0.7	-10	0	5	0.0	5.4	-11	5	5	0.0	6.4
-10	6	2	0.0	2.8	-10	0	4	0.0	12.0	-11	5	4	0.0	8.1
-10	6	1	0.0	1.8	-10	0	3	0.0	6.2	-11	5	3	15.7	17.5
-10	6	0	18.5	20.0	-10	0	2	0.0	2.3	-11	5	2	0.0	7.2
-10	5	10	0.0	11.5	-10	0	1	0.0	3.9	-11	5	1	0.0	10.3
-10	5	9	0.0	14.3	-10	0	0	11.5	11.5	-11	5	0	0.0	3.2
-10	5	8	0.0	3.5	-11	10	8	0.0	17.7	-11	4	9	0.0	4.4
-10	5	7	19.1	18.3	-11	10	7	0.0	7.5	-11	4	8	0.0	20.8
-10	5	6	0.0	14.0	-11	10	6	0.0	3.5	-11	4	7	0.0	8.6

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-10	5	5	24.6	24.8	-11	10	5	0.0	11.9	-11	4	6	0.0	7.6
-10	5	4	15.8	16.3	-11	10	4	33.2	32.7	-11	4	5	0.0	8.1
-10	5	3	25.8	26.1	-11	10	3	0.0	12.5	-11	4	4	33.2	32.8
-10	5	2	44.0	43.2	-11	10	2	0.0	7.7	-11	4	3	12.5	11.3
-10	5	1	31.4	31.4	-11	10	1	0.0	12.9	-11	4	2	0.0	12.3
-10	5	0	39.7	40.3	-11	10	0	43.2	41.7	-11	4	1	0.0	12.0
-10	4	9	0.0	4.0	-11	9	9	0.0	14.8	-11	4	0	39.7	38.9
-10	4	8	0.0	9.5	-11	9	8	0.0	15.7	-11	3	9	0.0	5.0
-10	4	7	0.0	0.7	-11	9	7	0.0	20.9	-11	3	8	0.0	6.1
-10	4	6	18.1	18.3	-11	9	6	0.0	0.8	-11	3	7	0.0	14.4
-10	4	5	0.0	5.1	-11	9	5	30.0	29.8	-11	3	6	0.0	12.5
-10	4	4	0.0	5.3	-11	9	4	20.7	20.6	-11	3	5	0.0	16.3
-10	4	3	0.0	3.6	-11	9	3	29.0	28.7	-11	3	4	0.0	1.3
-10	4	2	0.0	7.4	-11	9	2	0.0	9.9	-11	3	3	0.0	14.2
-10	4	1	0.0	5.5	-11	9	1	36.6	36.1	-11	3	2	0.0	6.9
-10	4	0	0.0	9.1	-11	9	0	15.8	15.3	-11	3	1	22.1	21.8
-10	3	9	0.0	9.7	-11	8	9	0.0	4.4	-11	3	0	0.0	4.0
-10	3	8	0.0	11.9	-11	8	8	0.0	1.1	-11	2	8	0.0	14.7
-10	3	7	0.0	14.3	-11	8	7	0.0	3.2	-11	2	7	0.0	7.8
-10	3	6	0.0	2.0	-11	8	6	26.7	27.8	-11	2	6	0.0	4.6
-10	3	5	0.0	3.1	-11	8	5	0.0	5.4	-11	2	5	0.0	6.4
-10	3	4	17.4	17.5	-11	8	4	0.0	5.7	-11	2	4	18.7	19.5
-10	3	3	25.2	25.7	-11	8	3	0.0	5.8	-11	2	3	16.8	17.4
-10	3	2	0.0	1.7	-11	8	2	16.6	16.5	-11	2	2	0.0	7.9
-10	3	1	0.0	10.0	-11	8	1	0.0	6.0	-11	2	1	0.0	9.1
-10	3	0	22.6	22.4	-11	8	0	23.3	23.0	-11	2	0	21.1	21.4
10	-2	9	0.0	0.1	-11	7	9	0.0	0.1	-11	1	8	0.0	5.1
-10	2	8	0.0	16.1	-11	7	8	0.0	27.7	-11	1	7	19.2	20.8
-10	2	7	0.0	2.5	-11	7	7	0.0	3.3	-11	1	6	0.0	21.4

-10	2	6	0.0	9.2	-11	7	6	0.0	2.3	-11	1	5	25.0	24.9
-10	2	5	0.0	1.3	-11	7	5	0.0	7.7	-11	1	4	0.0	11.0
-10	2	4	28.8	29.2	-11	7	4	44.7	43.7	-11	1	3	36.2	35.6
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-11	1	2	34.0	33.0	-12	6	8	0.0	5.4	-12	0	3	0.0	3.4
-11	1	1	33.1	32.6	-12	6	7	0.0	8.9	-12	0	2	0.0	7.2
-11	1	0	13.9	14.8	-12	6	6	0.0	17.1	-12	0	1	0.0	6.0
-11	0	8	0.0	9.1	-12	6	5	0.0	13.4	-12	0	0	38.7	39.4
-11	0	7	0.0	10.3	-12	6	4	0.0	15.6	-13	12	6	0.0	17.5
-11	0	6	0.0	15.9	-12	6	3	0.0	10.5	-13	12	5	0.0	1.3
-11	0	5	0.0	16.2	-12	6	2	31.2	31.0	-13	12	4	0.0	11.3
-11	0	4	0.0	2.9	-12	6	1	13.9	15.5	-13	12	3	0.0	5.8
-11	0	3	18.2	18.4	-12	6	0	24.2	24.3	-13	12	2	22.2	23.0
-11	0	2	0.0	1.0	-12	5	9	0.0	6.7	-13	12	1	0.0	0.2
-11	0	1	18.5	19.6	-12	5	8	0.0	2.3	-13	12	0	0.0	14.3
-11	0	0	0.0	9.9	-12	5	7	0.0	11.2	-13	11	7	0.0	8.0
-12	11	7	0.0	4.0	-12	5	6	0.0	8.0	-13	11	6	0.0	25.6
-12	11	6	0.0	8.4	-12	5	5	18.9	19.5	-13	11	5	0.0	13.1
-12	11	5	0.0	9.4	-12	5	4	0.0	3.4	-13	11	4	0.0	0.6
-12	11	4	0.0	5.5	-12	5	3	0.0	9.9	-13	11	3	0.0	12.0
-12	11	3	0.0	8.8	-12	5	2	0.0	9.7	-13	11	2	34.9	35.0
-12	11	2	0.0	4.5	-12	5	1	21.8	21.7	-13	11	1	0.0	13.6
-12	11	1	0.0	9.9	-12	5	0	0.0	5.5	-13	11	0	0.0	0.5
-12	11	0	0.0	1.8	-12	4	9	0.0	1.0	-13	10	7	0.0	10.4
12	-11	8	0.0	5.5	-12	4	8	0.0	8.3	-13	10	6	0.0	12.0
-12	10	7	0.0	18.6	-12	4	7	0.0	4.9	-13	10	5	0.0	15.0
-12	10	6	0.0	8.9	-12	4	6	35.2	35.7	-13	10	4	0.0	0.4
-12	10	5	0.0	15.4	-12	4	5	0.0	3.0	-13	10	3	0.0	16.1

-12	10	4	21.6	22.1	-12	4	4	21.9	22.1	-13	10	2	0.0	6.2
-12	10	3	33.1	32.6	-12	4	3	0.0	6.9	-13	10	1	15.9	17.4
-12	10	2	0.0	11.6	-12	4	2	31.4	31.3	-13	10	0	0.0	7.8
-12	10	1	23.9	23.3	-12	4	1	0.0	5.7	-13	9	7	0.0	0.5
-12	10	0	25.1	25.9	-12	4	0	37.7	36.7	-13	9	6	0.0	11.7
12	-10	8	0.0	15.1	-12	3	8	0.0	3.6	-13	9	5	0.0	0.8
-12	9	8	0.0	15.5	-12	3	7	0.0	9.2	-13	9	4	0.0	2.8
-12	9	7	0.0	5.7	-12	3	6	0.0	10.5	-13	9	3	0.0	8.2
-12	9	6	0.0	7.2	-12	3	5	0.0	11.9	-13	9	2	0.0	12.8
-12	9	5	0.0	6.4	-12	3	4	0.0	14.4	-13	9	1	0.0	1.5
-12	9	4	24.4	24.6	-12	3	3	0.0	12.7	-13	9	0	0.0	4.9
-12	9	3	0.0	9.1	-12	3	2	31.8	30.4	-13	8	7	0.0	0.8
-12	9	2	0.0	14.3	-12	3	1	13.8	14.8	-13	8	6	0.0	17.6
-12	9	1	0.0	9.0	-12	3	0	29.6	29.4	-13	8	5	0.0	0.0
-12	9	0	33.9	32.5	-12	2	8	0.0	7.3	-13	8	4	0.0	8.9
-12	8	8	0.0	7.6	-12	2	7	0.0	13.2	-13	8	3	0.0	0.6
-12	8	7	0.0	9.0	-12	2	6	0.0	1.8	-13	8	2	29.2	29.5
-12	8	6	0.0	20.6	-12	2	5	0.0	12.8	-13	8	1	0.0	0.8
-12	8	5	22.8	22.3	-12	2	4	0.0	9.6	-13	8	0	0.0	14.1
-12	8	4	0.0	10.8	-12	2	3	17.9	18.0	13	-8	8	0.0	3.9
-12	8	3	0.0	12.4	-12	2	2	0.0	2.4	-13	7	8	0.0	7.2
-12	8	2	26.3	26.2	-12	2	1	17.7	18.3	-13	7	7	0.0	11.7
-12	8	1	22.7	23.2	-12	2	0	0.0	11.3	-13	7	6	0.0	20.3
-12	8	0	0.0	12.4	-12	1	7	0.0	1.5	-13	7	5	0.0	16.6
-12	7	9	0.0	1.3	-12	1	6	28.3	29.6	-13	7	4	0.0	2.6
-12	7	8	0.0	7.7	-12	1	5	0.0	2.0	-13	7	3	16.6	16.9
-12	7	7	0.0	0.6	-12	1	4	0.0	18.5	-13	7	2	0.0	9.1
-12	7	6	0.0	7.7	-12	1	3	0.0	2.1	-13	7	1	19.3	18.9
-12	7	5	0.0	2.6	-12	1	2	31.0	30.3	-13	7	0	18.9	19.2

-12	7	4	0.0	5.3	-12	1	1	0.0	0.6	-13	6	8	0.0	14.7
-12	7	3	0.0	4.2	-12	1	0	28.4	29.2	-13	6	7	0.0	9.4
-12	7	2	0.0	3.1	-12	0	7	0.0	2.6	-13	6	6	0.0	2.8
-12	7	1	0.0	2.7	-12	0	6	0.0	4.1	-13	6	5	0.0	5.7
-12	7	0	0.0	2.5	-12	0	5	0.0	5.8	-13	6	4	17.6	18.3
-12	6	9	0.0	6.1	-12	0	4	23.8	25.9	-13	6	3	0.0	9.7
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-13	6	2	0.0	9.6	-14	12	4	0.0	11.1	-14	5	0	22.7	22.5
-13	6	1	0.0	9.1	-14	12	3	0.0	6.5	-14	4	7	0.0	1.6
-13	6	0	17.2	17.0	-14	12	2	0.0	3.5	-14	4	6	0.0	18.7
-13	5	8	0.0	16.3	-14	12	1	0.0	3.2	-14	4	5	0.0	3.5
-13	5	7	0.0	6.8	-14	12	0	0.0	11.8	-14	4	4	0.0	5.1
-13	5	6	0.0	4.4	14-11	7	0.0	0.2	-14	4	3	0.0	6.3	
-13	5	5	0.0	15.0	-14	11	6	0.0	6.4	-14	4	2	23.7	24.8
-13	5	4	25.8	26.8	-14	11	5	0.0	4.2	-14	4	1	0.0	1.4
-13	5	3	0.0	8.2	-14	11	4	0.0	9.6	-14	4	0	0.0	6.8
-13	5	2	0.0	7.6	-14	11	3	0.0	1.4	-14	3	6	0.0	1.8
-13	5	1	14.6	15.3	-14	11	2	0.0	3.8	-14	3	5	0.0	8.7
-13	5	0	34.1	33.5	-14	11	1	0.0	4.0	-14	3	4	0.0	8.0
-13	4	8	0.0	2.1	-14	11	0	0.0	1.0	-14	3	3	0.0	10.0
-13	4	7	0.0	4.5	-14	10	6	0.0	14.4	-14	3	2	0.0	2.4
-13	4	6	0.0	19.1	-14	10	5	0.0	1.2	-14	3	1	0.0	9.8
-13	4	5	0.0	0.3	-14	10	4	0.0	4.8	-14	3	0	0.0	6.0
-13	4	4	0.0	2.0	-14	10	3	0.0	2.3	-14	2	5	0.0	0.1
-13	4	3	0.0	5.9	-14	10	2	28.8	29.8	-14	2	4	0.0	12.9
-13	4	2	0.0	12.2	-14	10	1	0.0	1.1	-14	2	3	0.0	2.0
-13	4	1	0.0	3.3	-14	10	0	0.0	13.8	-14	2	2	0.0	8.9
-13	4	0	0.0	13.9	-14	9	7	0.0	19.6	-14	2	1	0.0	0.7

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-13	3	7	0.0	6.7	-14	9	6	0.0	6.2	-14	2	0	0.0	9.0
-13	3	6	0.0	8.9	-14	9	5	0.0	27.5	-14	1	5	0.0	11.9
-13	3	5	0.0	4.7	-14	9	4	0.0	17.7	-14	1	4	0.0	8.0
-13	3	4	23.8	24.4	-14	9	3	24.0	25.3	-14	1	3	0.0	17.6
-13	3	3	0.0	8.3	-14	9	2	0.0	8.2	-14	1	2	0.0	16.9
-13	3	2	17.1	15.6	-14	9	1	32.0	31.8	-14	1	1	0.0	14.6
-13	3	1	0.0	6.1	-14	9	0	18.3	19.8	-14	1	0	0.0	8.9
-13	3	0	25.2	24.6	-14	8	7	0.0	1.4	-14	0	4	0.0	11.4
-13	2	7	0.0	7.9	-14	8	6	0.0	1.7	-14	0	3	0.0	8.6
-13	2	6	0.0	10.6	-14	8	5	0.0	6.4	-14	0	2	0.0	7.1
-13	2	5	0.0	5.2	-14	8	4	0.0	14.7	-14	0	1	0.0	10.4
-13	2	4	0.0	18.3	-14	8	3	0.0	1.8	-14	0	0	0.0	9.3
-13	2	3	0.0	15.9	-14	8	2	0.0	6.5	15-14	2	0.0	4.1	
-13	2	2	0.0	14.6	-14	8	1	0.0	6.1	-15	14	1	0.0	11.7
-13	2	1	0.0	8.2	-14	8	0	0.0	9.6	-15	14	0	0.0	1.7
-13	2	0	21.9	21.4	-14	7	7	0.0	10.5	15-14	3	0.0	11.5	
-13	1	6	0.0	3.5	-14	7	6	0.0	17.9	15-14	4	0.0	8.2	
-13	1	5	0.0	5.7	-14	7	5	0.0	17.2	15-13	5	0.0	0.5	
-13	1	4	0.0	8.5	-14	7	4	0.0	3.1	-15	13	4	0.0	8.1
-13	1	3	0.0	14.9	-14	7	3	0.0	14.5	15-13	3	0.0	4.7	
-13	1	2	0.0	0.8	-14	7	2	29.2	30.1	15-13	2	0.0	1.3	
-13	1	1	0.0	10.4	-14	7	1	19.5	19.2	-15	13	1	0.0	2.7
-13	1	0	0.0	7.2	-14	7	0	0.0	9.1	-15	13	0	0.0	7.7
-13	0	6	0.0	1.8	-14	6	7	0.0	15.6	-15	12	5	0.0	4.7
-13	0	5	0.0	1.0	-14	6	6	0.0	5.2	-15	12	4	0.0	23.3
-13	0	4	0.0	7.7	-14	6	5	0.0	20.0	-15	12	3	0.0	2.2
-13	0	3	0.0	2.5	-14	6	4	0.0	15.5	-15	12	2	0.0	0.5
-13	0	2	0.0	0.4	-14	6	3	0.0	16.3	-15	12	1	0.0	3.5
-13	0	1	0.0	0.6	-14	6	2	0.0	7.3	-15	12	0	29.1	29.0

-13	0	0	0.0	7.2	-14	6	1	23.9	24.1	15-11	6	0.0	13.0	
-14	13	5	0.0	11.5	-14	6	0	17.2	18.3	-15	11	5	0.0	6.1
14-13	4	0.0	4.4	-14	5	7	0.0	0.2	-15	11	4	0.0	1.9	
-14	13	3	0.0	17.3	-14	5	6	0.0	8.9	-15	11	3	0.0	2.8
-14	13	2	23.4	25.8	-14	5	5	0.0	0.4	-15	11	2	0.0	10.5
-14	13	1	0.0	14.4	-14	5	4	0.0	22.2	-15	11	1	0.0	5.9
-14	13	0	0.0	9.2	-14	5	3	0.0	3.1	-15	11	0	0.0	7.4
14-12	6	0.0	1.3	-14	5	2	0.0	16.1	15-10	6	0.0	2.7		
-14	12	5	0.0	2.2	-14	5	1	0.0	1.2	-15	10	5	0.0	2.0
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-15	10	4	0.0	12.1	-15	2	2	0.0	1.3	-16	8	0	0.0	19.8
-15	10	3	0.0	0.3	-15	2	1	0.0	15.4	-16	7	4	0.0	2.9
-15	10	2	0.0	3.6	-15	2	0	0.0	1.8	-16	7	3	0.0	12.2
-15	10	1	0.0	1.9	-15	1	3	0.0	1.3	-16	7	2	0.0	3.3
-15	10	0	0.0	14.0	-15	1	2	0.0	9.3	-16	7	1	0.0	11.9
-15	9	6	0.0	3.8	-15	1	1	0.0	3.1	-16	7	0	0.0	2.1
-15	9	5	0.0	5.6	-15	1	0	0.0	1.2	-16	6	4	0.0	14.4
-15	9	4	0.0	21.3	-15	0	3	0.0	6.1	-16	6	3	0.0	6.4
-15	9	3	0.0	0.1	-15	0	2	0.0	3.0	-16	6	2	0.0	9.6
-15	9	2	0.0	7.0	-15	0	1	0.0	5.4	-16	6	1	0.0	6.3
-15	9	1	0.0	5.6	15	0	0	0.0	22.5	-16	6	0	0.0	8.7
-15	9	0	24.5	26.5	16-15	1	0.0	2.2	-16	5	4	0.0	17.9	
-15	8	6	0.0	9.7	16-15	2	0.0	12.1	-16	5	3	0.0	6.1	
-15	8	5	0.0	8.5	-16	14	1	0.0	8.3	-16	5	2	0.0	3.8
-15	8	4	0.0	1.0	-16	14	0	0.0	7.9	-16	5	1	0.0	3.3
-15	8	3	0.0	0.6	16-14	2	0.0	12.5	-16	5	0	0.0	19.9	
-15	8	2	0.0	9.7	16-14	3	0.0	5.9	-16	4	3	0.0	1.5	
-15	8	1	0.0	7.8	16-13	4	0.0	0.6	-16	4	2	0.0	14.6	

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-15	8	0	0.0	2.9	-16	13	2	0.0	7.5	-16	4	1	0.0	0.7
-15	7	6	0.0	21.1	-16	13	1	0.0	0.5	-16	4	0	0.0	10.3
-15	7	5	0.0	0.1	-16	13	0	0.0	0.7	-16	3	3	0.0	7.8
-15	7	4	0.0	16.4	16-13	3	0.0	2.3	-16	3	2	0.0	0.9	
-15	7	3	0.0	2.7	16-12	5	0.0	1.6	-16	3	1	0.0	5.3	
-15	7	2	25.7	27.4	16-12	4	0.0	15.3	-16	3	0	0.0	4.9	
-15	7	1	0.0	0.4	-16	12	3	0.0	2.3	-16	2	3	0.0	11.2
-15	7	0	19.0	19.2	-16	12	2	0.0	22.3	-16	2	2	0.0	15.9
-15	6	6	0.0	7.9	-16	12	1	0.0	1.8	-16	2	1	0.0	9.8
-15	6	5	0.0	10.2	-16	12	0	0.0	20.0	-16	2	0	0.0	5.9
-15	6	4	0.0	12.7	16-11	5	0.0	1.0	-16	1	2	0.0	5.6	
-15	6	3	0.0	9.3	-16	11	4	0.0	14.2	-16	1	1	0.0	3.9
-15	6	2	19.2	19.7	-16	11	3	0.0	5.9	-16	1	0	0.0	2.4
-15	6	1	0.0	12.4	-16	11	2	0.0	8.0	17-14	1	0.0	1.2	
-15	6	0	20.9	21.5	-16	11	1	0.0	1.0	17-12	3	0.0	0.1	
-15	5	5	0.0	1.2	-16	11	0	0.0	15.6	17-11	3	0.0	9.7	
-15	5	4	0.0	6.3	16-10	5	0.0	3.0	17-11	2	0.0	7.7		
-15	5	3	0.0	6.5	-16	10	4	0.0	7.3	17-10	4	0.0	0.7	
-15	5	2	0.0	0.7	-16	10	3	0.0	3.1	17-10	3	0.0	15.8	
-15	5	1	0.0	2.4	-16	10	2	0.0	2.4	17-10	2	0.0	22.1	
-15	5	0	0.0	4.2	-16	10	1	0.0	2.5	17	-9	3	0.0	4.9
-15	4	5	0.0	4.6	-16	10	0	0.0	4.5	-17	9	2	0.0	3.8
-15	4	4	0.0	19.3	16	-9	6	0.0	15.2	-17	9	1	0.0	4.6
-15	4	3	0.0	3.8	16	-9	5	0.0	0.6	-17	9	0	0.0	1.5
-15	4	2	0.0	30.0	-16	9	4	0.0	5.9	-17	8	2	0.0	0.4
-15	4	1	0.0	4.0	-16	9	3	0.0	0.1	-17	8	1	0.0	2.7
-15	4	0	18.7	22.5	-16	9	2	0.0	10.8	-17	8	0	0.0	6.6
-15	3	4	0.0	10.5	-16	9	1	0.0	0.9	-17	7	2	0.0	19.8
-15	3	3	0.0	1.0	-16	9	0	0.0	12.9	-17	7	1	0.0	16.2

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-15	3	2	0.0	17.7	-16	8	4	0.0	17.9	-17	5	1	0.0	1.6
-15	3	1	0.0	0.9	-16	8	3	0.0	11.9	-17	4	2	0.0	9.8
-15	3	0	19.1	20.4	-16	8	2	0.0	5.5	-17	4	1	0.0	3.3
-15	2	3	0.0	14.9	-16	8	1	0.0	11.0	-17	3	1	0.0	15.4

Rare Earth Elements in Chlorapatite [Ca₁₀(PO₄)₆(Cl)₂]:

Uptake, Site Preference and
Degradation of Monoclinic Structure

Michael E. Fleet, Xioayang Liu
and Yuanming Pan

Deposited Material

Table 5. List of observed and calculated structure factors

(d) *P*6₃/*m* structure of Dy-chlorapatite

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	0	2	98.9	100.8	1	-3	0	0.0	2.4	4	-5	3	0.0	0.7
0	0	4	206.7	202.6	-3	0	10	0.0	3.8	4	-5	2	37.9	38.2
0	0	6	95.9	95.2	-3	0	9	0.0	5.5	4	-5	1	0.0	3.1
0	0	8	82.0	76.5	-3	0	8	33.1	33.9	4	-5	0	96.9	97.6
0	0	10	37.0	39.3	-3	0	7	0.0	9.2	3	-5	9	0.0	16.6
-1	0	10	0.0	11.5	-3	0	6	0.0	7.9	3	-5	8	0.0	1.6
-1	0	9	0.0	2.5	-3	0	5	0.0	10.2	3	-5	7	23.7	25.2
-1	0	8	0.0	15.5	-3	0	4	77.9	77.2	3	-5	6	30.7	30.7
-1	0	7	0.0	5.1	-3	0	3	25.1	25.1	3	-5	5	28.0	28.3
-1	0	6	19.4	19.1	-3	0	2	44.9	44.2	3	-5	4	0.0	11.4
-1	0	5	0.0	7.9	-3	0	1	26.9	26.4	3	-5	3	51.4	51.3
-1	0	4	23.6	23.4	-3	0	0	155.7	155.4	3	-5	2	41.1	41.4
-1	0	3	0.0	4.2	3	-4	9	0.0	13.9	3	-5	1	50.2	50.6
-1	0	2	0.0	0.5	3	-4	8	0.0	3.7	3	-5	0	15.3	14.7
-1	0	1	16.2	16.3	3	-4	7	0.0	7.6	2	-5	9	0.0	18.1
-1	0	0	15.9	16.2	3	-4	6	0.0	14.6	2	-5	8	0.0	21.8
1	-2	10	0.0	30.4	3	-4	5	0.0	5.6	2	-5	7	0.0	19.6
1	-2	9	0.0	6.9	3	-4	4	0.0	4.5	2	-5	6	0.0	6.5
1	-2	8	0.0	2.7	3	-4	3	41.3	40.9	2	-5	5	49.1	49.8
1	-2	7	0.0	4.2	3	-4	2	39.5	39.4	2	-5	4	38.7	39.1
1	-2	6	66.5	65.3	3	-4	1	9.6	7.7	2	-5	3	17.2	17.8
1	-2	5	0.0	13.2	3	-4	0	19.6	19.6	2	-5	2	12.8	13.2
1	-2	4	11.8	11.8	2	-4	10	0.0	26.5	2	-5	1	63.6	63.6
1	-2	3	42.2	41.6	2	-4	9	0.0	0.1	2	-5	0	61.3	60.7
1	-2	2	113.8	114.9	2	-4	8	0.0	1.7	1	-5	9	0.0	5.6
1	-2	1	13.0	13.4	2	-4	7	0.0	2.6	1	-5	8	25.6	27.8
1	-2	0	0.0	3.8	2	-4	6	51.3	51.0	1	-5	7	0.0	6.2
-2	0	10	0.0	11.5	2	-4	5	0.0	9.7	1	-5	6	16.3	18.1

-2	0	9	0.0	1.3	2	-4	4	0.0	3.9	1	-5	5	0.0	0.7
-2	0	8	0.0	7.8	2	-4	3	9.4	9.6	1	-5	4	51.5	51.1
-2	0	7	0.0	1.1	2	-4	2	119.5	118.4	1	-5	3	17.7	18.8
-2	0	6	20.2	19.7	2	-4	1	0.0	8.0	1	-5	2	32.8	33.1
-2	0	5	19.4	20.6	2	-4	0	21.9	22.2	1	-5	1	0.0	3.7
-2	0	4	0.0	5.4	1	-4	9	0.0	13.0	1	-5	0	67.6	68.1
-2	0	3	26.1	25.4	1	-4	8	0.0	13.7	-5	0	9	0.0	2.0
-2	0	2	39.5	39.0	1	-4	7	24.1	24.9	-5	0	8	0.0	10.3
-2	0	1	23.4	23.2	1	-4	6	43.1	43.8	-5	0	7	0.0	3.7
-2	0	0	6.3	5.2	1	-4	5	27.3	26.8	-5	0	6	34.4	33.0
2	-3	10	0.0	1.4	1	-4	4	0.0	4.9	-5	0	5	24.4	25.5
2	-3	9	0.0	33.8	1	-4	3	39.6	39.2	-5	0	4	18.8	18.8
2	-3	8	0.0	20.7	1	-4	2	29.3	29.0	-5	0	3	0.0	8.8
2	-3	7	35.5	36.5	1	-4	1	43.1	43.2	-5	0	2	54.7	54.4
2	-3	6	0.0	0.7	1	-4	0	88.9	85.1	-5	0	1	33.5	33.2
2	-3	5	58.7	58.3	-4	0	9	0.0	3.7	-5	0	0	12.3	12.8
2	-3	4	29.3	29.4	-4	0	8	0.0	6.4	5	-6	9	0.0	30.6
2	-3	3	81.2	81.3	-4	0	7	0.0	9.3	5	-6	8	38.2	37.8
2	-3	2	9.9	9.5	-4	0	6	36.2	37.0	5	-6	7	32.7	33.6
2	-3	1	96.5	97.4	-4	0	5	12.5	14.1	5	-6	6	0.0	9.8
2	-3	0	43.2	44.7	-4	0	4	14.1	13.8	5	-6	5	52.7	52.3
1	-3	10	0.0	7.2	-4	0	3	0.0	3.4	5	-6	4	53.0	52.9
1	-3	9	0.0	21.3	-4	0	2	52.5	52.8	5	-6	3	58.7	57.9
1	-3	8	30.5	31.8	-4	0	1	13.1	13.1	5	-6	2	46.6	47.5
1	-3	7	34.7	34.4	-4	0	0	25.2	25.5	5	-6	1	71.0	70.4
1	-3	6	0.0	14.9	4	-5	9	0.0	0.5	5	-6	0	43.2	43.6
1	-3	5	38.7	38.2	4	-5	8	0.0	20.9	4	-6	9	0.0	7.1
1	-3	4	40.6	40.6	4	-5	7	0.0	3.0	4	-6	8	37.7	38.2

1	-3	3	64.6	64.8	4	-5	6	0.0	13.9	4	-6	7	0.0	16.1
1	-3	2	50.3	48.8	4	-5	5	0.0	2.5	4	-6	6	0.0	4.5
1	-3	1	68.4	69.5	4	-5	4	54.3	54.6	4	-6	5	17.5	16.9
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
4	-6	4	44.1	44.0	5	-7	4	42.2	42.0	7	-8	2	42.1	43.4
4	-6	3	26.9	27.2	5	-7	3	38.0	37.9	7	-8	1	15.8	15.2
4	-6	2	48.3	48.6	5	-7	2	30.2	30.0	7	-8	0	49.1	48.7
4	-6	1	30.7	30.5	5	-7	1	33.4	33.9	6	-8	8	0.0	3.6
4	-6	0	0.0	11.3	5	-7	0	78.6	79.1	6	-8	7	0.0	4.1
3	-6	9	0.0	9.5	-4	7	9	0.0	15.3	6	-8	6	0.0	11.7
3	-6	8	0.0	12.7	4	-7	8	0.0	13.6	6	-8	5	0.0	11.2
3	-6	7	0.0	18.3	4	-7	7	25.7	26.9	6	-8	4	0.0	3.4
3	-6	6	32.7	32.8	4	-7	6	0.0	8.1	6	-8	3	0.0	7.9
3	-6	5	28.1	29.2	4	-7	5	20.6	21.9	6	-8	2	18.3	18.4
3	-6	4	28.4	29.4	4	-7	4	21.2	20.8	6	-8	1	0.0	10.8
3	-6	3	15.5	15.0	4	-7	3	51.7	53.1	6	-8	0	0.0	7.5
3	-6	2	52.7	53.4	4	-7	2	0.0	1.2	5	-8	8	0.0	4.1
3	-6	1	39.5	39.9	4	-7	1	41.6	41.5	5	-8	7	0.0	11.2
3	-6	0	41.0	41.4	4	-7	0	19.3	18.4	5	-8	6	0.0	14.2
2	-6	9	0.0	20.8	-3	7	9	0.0	2.2	5	-8	5	0.0	3.6
2	-6	8	31.3	32.8	3	-7	8	0.0	14.0	5	-8	4	0.0	3.3
2	-6	7	0.0	18.7	3	-7	7	0.0	1.4	5	-8	3	18.8	19.8
2	-6	6	0.0	16.0	3	-7	6	42.8	41.7	5	-8	2	16.2	17.2
2	-6	5	22.7	22.7	3	-7	5	0.0	8.0	5	-8	1	0.0	11.0
2	-6	4	48.4	47.9	3	-7	4	29.5	29.7	5	-8	0	0.0	2.6
2	-6	3	45.7	46.2	3	-7	3	0.0	3.7	4	-8	8	0.0	37.4
2	-6	2	36.4	36.8	3	-7	2	62.2	62.4	4	-8	7	0.0	13.2
2	-6	1	31.0	31.4	3	-7	1	0.0	9.0	4	-8	6	0.0	2.9
2	-6	0	58.6	58.3	3	-7	0	39.9	41.5	4	-8	5	24.4	26.3

1	-6	9	0.0	7.6	-2	7	9	0.0	6.2	4	-8	4	63.3	63.4
1	-6	8	0.0	17.6	2	-7	8	0.0	5.5	4	-8	3	0.0	8.8
1	-6	7	0.0	18.3	2	-7	7	0.0	6.8	4	-8	2	0.0	2.7
1	-6	6	0.0	14.6	2	-7	6	22.9	24.7	4	-8	1	33.3	34.0
1	-6	5	19.6	19.6	2	-7	5	0.0	7.8	4	-8	0	78.7	76.8
1	-6	4	12.5	11.6	2	-7	4	0.0	9.2	3	-8	8	0.0	14.0
1	-6	3	18.2	18.1	2	-7	3	0.0	9.5	3	-8	7	0.0	4.8
1	-6	2	0.0	1.7	2	-7	2	84.2	84.4	3	-8	6	42.2	40.9
1	-6	1	28.3	29.1	2	-7	1	0.0	10.1	3	-8	5	0.0	7.3
1	-6	0	0.0	4.3	2	-7	0	49.7	50.6	3	-8	4	26.3	26.4
6	0	9	0.0	10.8	1	-7	8	31.5	31.0	3	-8	3	0.0	7.5
-6	0	8	0.0	10.0	1	-7	7	0.0	5.5	3	-8	2	53.0	53.0
-6	0	7	0.0	16.5	-1	7	6	0.0	3.7	3	-8	1	0.0	9.6
6	0	6	35.7	36.3	1	-7	5	0.0	13.6	3	-8	0	37.7	36.8
-6	0	5	0.0	8.1	1	-7	4	40.7	41.3	2	-8	8	0.0	21.5
-6	0	4	18.9	20.3	1	-7	3	0.0	15.6	2	-8	7	0.0	3.6
-6	0	3	29.2	29.5	1	-7	2	32.6	33.7	2	-8	6	0.0	1.8
-6	0	2	53.5	52.4	1	-7	1	19.4	20.5	2	-8	5	0.0	0.2
-6	0	1	14.2	15.0	1	-7	0	29.6	30.0	2	-8	4	27.3	28.0
-6	0	0	23.7	25.0	-7	0	8	0.0	5.1	2	-8	3	0.0	4.6
6	-7	8	0.0	15.3	-7	0	7	0.0	8.2	2	-8	2	0.0	12.0
6	-7	7	0.0	4.8	7	0	6	26.0	25.4	2	-8	1	0.0	3.0
6	-7	6	0.0	1.1	-7	0	5	0.0	1.4	2	-8	0	18.1	17.1
6	-7	5	0.0	7.6	-7	0	4	0.0	12.9	1	-8	8	0.0	33.5
6	-7	4	23.2	23.5	-7	0	3	21.6	22.0	1	-8	7	0.0	10.8
6	-7	3	0.0	4.9	-7	0	2	36.0	36.3	-1	8	6	0.0	1.3
6	-7	2	0.0	3.5	-7	0	1	0.0	4.8	1	-8	5	0.0	1.5
6	-7	1	0.0	9.2	-7	0	0	15.9	15.9	1	-8	4	55.0	54.1

6	-7	0	30.8	30.9	7	-8	8	0.0	10.2	1	-8	3	25.9	26.9
-5	7	9	0.0	15.7	7	-8	7	0.0	9.9	1	-8	2	0.0	0.8
5	-7	8	0.0	18.3	7	-8	6	0.0	14.6	1	-8	1	0.0	10.5
5	-7	7	0.0	22.2	7	-8	5	0.0	13.0	1	-8	0	67.2	65.2
5	-7	6	0.0	5.6	7	-8	4	28.5	28.0	-8	0	8	0.0	15.4
5	-7	5	20.0	21.3	7	-8	3	0.0	10.6	-8	0	7	0.0	2.7
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
8	0	6	50.3	48.5	3	-9	0	0.0	0.5	5-10	5	0.0	23.7	
-8	0	5	0.0	3.4	2	-9	8	0.0	20.3	5-10	4	0.0	15.7	
-8	0	4	35.6	34.8	2	-9	7	0.0	14.2	5-10	3	24.3	25.3	
-8	0	3	0.0	4.8	2	-9	6	0.0	6.8	5-10	2	42.9	42.3	
-8	0	2	53.1	52.8	2	-9	5	0.0	11.4	5-10	1	31.1	30.5	
-8	0	1	0.0	1.1	2	-9	4	26.2	25.8	5-10	0	39.3	39.2	
-8	0	0	56.5	55.3	2	-9	3	0.0	22.8	4-10	7	0.0	3.0	
8	-9	7	0.0	6.3	2	-9	2	15.2	15.4	4-10	6	0.0	0.5	
8	-9	6	24.6	25.7	2	-9	1	0.0	17.6	4-10	5	0.0	5.6	
8	-9	5	0.0	10.8	2	-9	0	26.2	27.1	4-10	4	0.0	17.0	
8	-9	4	0.0	2.8	1	-9	7	0.0	5.4	4-10	3	0.0	0.2	
8	-9	3	0.0	11.9	-1	9	6	0.0	1.6	4-10	2	0.0	1.7	
8	-9	2	0.0	4.9	1	-9	5	0.0	2.6	4-10	1	0.0	2.7	
8	-9	1	0.0	14.1	1	-9	4	0.0	13.9	4-10	0	0.0	18.3	
8	-9	0	21.4	22.0	1	-9	3	0.0	0.6	3-10	7	0.0	8.0	
-7	9	8	0.0	18.2	1	-9	2	0.0	1.1	3-10	6	0.0	20.2	
7	-9	7	0.0	12.6	1	-9	1	0.0	6.7	3-10	5	0.0	13.1	
7	-9	6	0.0	1.2	1	-9	0	15.7	18.4	3-10	4	0.0	2.5	
7	-9	5	0.0	14.9	9	0	7	0.0	17.5	3-10	3	0.0	7.8	
7	-9	4	0.0	20.1	9	0	6	0.0	23.2	3-10	2	0.0	11.0	
7	-9	3	0.0	16.6	9	0	5	0.0	15.6	3-10	1	0.0	14.7	
7	-9	2	0.0	8.0	-9	0	4	0.0	10.7	3-10	0	0.0	15.1	

7	-9	1	17.1	18.9	-9	0	3	30.4	28.7	2-10	7	0.0	10.4	
7	-9	0	0.0	15.0	-9	0	2	40.7	39.2	-2	10	6	0.0	20.3
-6	9	8	0.0	4.7	-9	0	1	24.7	24.2	2-10	5	0.0	14.1	
6	-9	7	33.7	35.6	-9	0	0	0.0	18.7	2-10	4	0.0	9.2	
6	-9	6	44.8	43.4	9-10	6	0.0	1.1	2-10	3	0.0	17.6		
6	-9	5	45.6	44.8	9-10	5	0.0	13.1	2-10	2	49.2	48.1		
6	-9	4	0.0	4.4	9-10	4	0.0	17.1	2-10	1	20.4	18.6		
6	-9	3	46.3	46.5	9-10	3	30.2	28.9	2-10	0	26.3	28.3		
6	-9	2	68.6	67.1	9-10	2	0.0	3.1	-1	10	6	0.0	1.4	
6	-9	1	60.8	60.3	9-10	1	22.2	21.1	-1	10	5	0.0	9.3	
6	-9	0	0.0	3.3	9-10	0	0.0	14.1	1-10	4	0.0	12.3		
-5	9	8	0.0	15.9	8-10	7	0.0	2.7	1-10	3	20.4	21.1		
5	-9	7	0.0	8.0	8-10	6	0.0	9.1	1-10	2	0.0	1.0		
5	-9	6	0.0	17.7	8-10	5	0.0	1.3	1-10	1	0.0	12.5		
5	-9	5	0.0	14.1	8-10	4	27.8	27.8	1-10	0	0.0	13.9		
5	-9	4	0.0	7.2	8-10	3	0.0	1.1	10	0	6	0.0	1.2	
5	-9	3	0.0	13.2	8-10	2	0.0	19.3	10	0	5	0.0	4.9	
5	-9	2	0.0	1.8	8-10	1	0.0	0.6	-10	0	4	0.0	11.3	
5	-9	1	0.0	17.0	8-10	0	39.0	39.2	-10	0	3	0.0	6.5	
5	-9	0	0.0	14.5	7-10	7	0.0	13.8	-10	0	2	0.0	1.9	
-4	9	8	0.0	12.2	7-10	6	0.0	1.6	-10	0	1	0.0	3.1	
4	-9	7	0.0	9.3	7-10	5	0.0	2.5	-10	0	0	0.0	11.0	
4	-9	6	0.0	7.1	7-10	4	0.0	16.4	10-11	5	0.0	22.7		
4	-9	5	0.0	21.4	7-10	3	0.0	24.9	10-11	4	0.0	10.9		
4	-9	4	0.0	13.0	7-10	2	0.0	0.9	10-11	3	31.4	33.2		
4	-9	3	0.0	16.2	7-10	1	0.0	9.3	10-11	2	31.3	31.2		
4	-9	2	0.0	0.7	7-10	0	20.2	21.0	10-11	1	31.1	30.1		
4	-9	1	24.6	26.1	-6	10	7	0.0	1.0	10-11	0	0.0	14.6	

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

4	-9	0	0.0	9.6	6-10	6	0.0	18.0	9-11	6	0.0	4.9		
3	-9	8	0.0	1.5	6-10	5	0.0	5.4	9-11	5	0.0	6.2		
3	-9	7	0.0	8.3	6-10	4	0.0	5.3	9-11	4	0.0	19.4		
3	-9	6	39.7	40.6	6-10	3	0.0	4.1	9-11	3	0.0	17.1		
3	-9	5	0.0	20.5	6-10	2	0.0	7.0	9-11	2	0.0	8.4		
3	-9	4	0.0	2.5	6-10	1	0.0	5.9	9-11	1	0.0	9.2		
3	-9	3	0.0	0.4	6-10	0	0.0	9.1	9-11	0	0.0	21.3		
3	-9	2	58.0	56.7	5-10	7	0.0	17.2	8-11	6	0.0	11.4		
3	-9	1	20.5	20.8	5-10	6	0.0	13.6	8-11	5	0.0	15.3		
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
8-11	4	0.0	1.7	11-12	4	0.0	17.8	2-12	2	0.0	11.0			
8-11	3	0.0	13.6	11-12	3	0.0	1.7	2-12	1	0.0	22.4			
8-11	2	0.0	6.2	11-12	2	29.2	28.9	2-12	0	22.0	24.6			
8-11	1	0.0	21.0	11-12	1	0.0	1.2	-1	12	4	0.0	5.8		
8-11	0	0.0	3.4	11-12	0	27.1	28.2	1-12	3	0.0	7.9			
7-11	6	0.0	7.5	10-12	5	0.0	11.8	1-12	2	0.0	3.7			
7-11	5	0.0	6.8	10-12	4	0.0	9.7	1-12	1	0.0	8.8			
7-11	4	30.9	31.5	10-12	3	0.0	16.9	1-12	0	0.0	1.8			
7-11	3	0.0	9.9	10-12	2	0.0	1.7	-12	0	3	0.0	2.6		
7-11	2	0.0	11.8	10-12	1	0.0	17.2	-12	0	2	0.0	6.6		
7-11	1	0.0	10.3	10-12	0	0.0	11.2	-12	0	1	0.0	4.9		
7-11	0	38.4	37.6	9-12	5	0.0	10.8	-12	0	0	0.0	37.6		
6-11	6	0.0	8.8	9-12	4	0.0	13.4	12-13	2	0.0	1.2			
6-11	5	0.0	5.8	9-12	3	0.0	11.5	12-13	1	0.0	9.4			
6-11	4	0.0	8.0	9-12	2	30.5	29.2	12-13	0	0.0	6.2			
6-11	3	0.0	16.4	9-12	1	0.0	13.4	11-13	3	0.0	14.3			
6-11	2	0.0	6.9	9-12	0	29.6	28.4	11-13	2	0.0	13.9			
6-11	1	0.0	9.7	8-12	5	0.0	2.9	11-13	1	0.0	6.7			
6-11	0	0.0	3.3	8-12	4	0.0	20.7	11-13	0	21.8	19.8			

5-11	6	0.0	12.1	8-12	3	0.0	6.6	10-13	4	0.0	23.0	
5-11	5	0.0	27.8	8-12	2	30.5	29.2	10-13	3	0.0	8.3	
5-11	4	31.9	30.2	8-12	1	0.0	5.8	10-13	2	0.0	14.7	
5-11	3	0.0	20.3	8-12	0	36.2	34.8	10-13	1	0.0	6.1	
5-11	2	0.0	19.7	7-12	6	0.0	7.9	10-13	0	0.0	23.0	
5-11	1	34.3	32.4	7-12	5	0.0	18.5	9-13	4	0.0	1.5	
5-11	0	35.5	34.2	7-12	4	0.0	2.8	9-13	3	0.0	5.7	
4-11	6	0.0	2.0	7-12	3	0.0	8.7	9-13	2	0.0	11.2	
4-11	5	0.0	7.8	7-12	2	0.0	9.8	9-13	1	0.0	3.4	
4-11	4	41.6	41.5	7-12	1	0.0	20.5	9-13	0	0.0	13.0	
4-11	3	0.0	0.4	7-12	0	0.0	4.5	8-13	4	0.0	25.7	
4-11	2	0.0	0.7	6-12	6	0.0	16.3	8-13	3	0.0	8.4	
4-11	1	0.0	7.8	6-12	5	0.0	12.5	8-13	2	0.0	6.8	
4-11	0	51.7	50.7	6-12	4	0.0	14.9	8-13	1	0.0	15.4	
3-11	6	0.0	26.4	6-12	3	0.0	9.7	8-13	0	31.3	32.3	
3-11	5	0.0	4.9	6-12	2	30.8	29.7	7-13	5	0.0	4.9	
3-11	4	0.0	5.0	6-12	1	0.0	14.4	7-13	4	0.0	16.9	
3-11	3	0.0	4.9	6-12	0	0.0	23.3	7-13	3	0.0	9.1	
3-11	2	0.0	15.4	5-12	6	0.0	6.6	7-13	2	0.0	8.7	
3-11	1	0.0	5.3	5-12	5	0.0	2.7	7-13	1	0.0	8.4	
3-11	0	22.5	22.1	5-12	4	0.0	5.6	7-13	0	0.0	15.3	
-2	11	6	0.0	1.0	5-12	3	0.0	3.8	6-13	5	0.0	15.8
2-11	5	0.0	27.7	5-12	2	0.0	2.2	6-13	4	0.0	1.8	
2-11	4	0.0	19.4	5-12	1	0.0	2.8	6-13	3	0.0	16.0	
2-11	3	0.0	27.1	5-12	0	0.0	3.1	6-13	2	0.0	7.7	
2-11	2	0.0	9.2	4-12	5	0.0	20.9	6-13	1	0.0	18.1	
2-11	1	33.1	34.0	4-12	4	0.0	10.1	6-13	0	0.0	18.0	
2-11	0	0.0	14.2	4-12	3	0.0	11.0	5-13	4	0.0	8.2	

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

-1	11	5	0.0	11.7	4-12	2	0.0	25.0	5-13	3	0.0	0.7		
1-11	4	0.0	30.6	4-12	1	0.0	21.6	5-13	2	0.0	28.4			
1-11	3	0.0	12.2	4-12	0	0.0	11.9	5-13	1	0.0	1.0			
1-11	2	0.0	7.9	3-12	5	0.0	5.5	5-13	0	0.0	13.3			
1-11	1	0.0	12.6	3-12	4	0.0	24.0	4-13	4	0.0	3.0			
1-11	0	41.8	39.5	3-12	3	0.0	8.1	4-13	3	0.0	8.3			
11	0	5	0.0	15.7	3-12	2	0.0	12.7	4-13	2	0.0	12.4		
-11	0	4	0.0	2.9	3-12	1	0.0	8.0	4-13	1	0.0	1.9		
-11	0	3	0.0	17.7	3-12	0	30.7	31.6	4-13	0	0.0	5.1		
-11	0	2	0.0	0.5	-2	12	5	0.0	14.4	3-13	4	0.0	0.6	
-11	0	1	0.0	19.1	2-12	4	0.0	20.8	3-13	3	0.0	15.1		
-11	0	0	0.0	9.6	2-12	3	0.0	31.5	3-13	2	0.0	5.9		
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
3-13	1	0.0	16.4	9-14	3	0.0	3.2	6-14	2	0.0	6.3			
3-13	0	0.0	7.7	9-14	2	0.0	14.9	6-14	1	0.0	5.4			
2-13	3	0.0	10.6	9-14	1	0.0	1.2	6-14	0	0.0	9.2			
2-13	2	0.0	33.1	9-14	0	0.0	21.2	5-14	3	0.0	23.2			
2-13	1	0.0	12.3	8-14	3	0.0	15.2	5-14	2	0.0	7.2			
2-13	0	0.0	0.4	8-14	2	0.0	6.3	5-14	1	0.0	29.5			
1-13	2	0.0	20.6	8-14	1	0.0	22.7	5-14	0	0.0	17.9			
1-13	1	0.0	0.1	8-14	0	0.0	16.7	4-14	2	0.0	28.2			
1-13	0	0.0	12.4	7-14	3	0.0	14.1	4-14	1	0.0	2.0			
11-14	1	0.0	9.7	7-14	2	0.0	28.1	4-14	0	0.0	13.2			
10-14	2	0.0	23.0	7-14	1	0.0	18.4	3-14	1	0.0	3.2			
10-14	1	0.0	2.5	7-14	0	0.0	9.0	3-14	0	0.0	0.2			
10-14	0	0.0	6.6	6-14	3	0.0	1.1	0	0	0	0.0	0.0		

Rare Earth Elements in Chlorapatite [Ca₁₀(PO₄)₆(Cl)₂]:

Uptake, Site Preference and
Degradation of Monoclinic Structure
Michael E. Fleet, Xiaoayang Liu
and Yuanming Pan

Deposited Material

Table 5. List of observed and calculated structure factors

(e) $P2_1/b$ structure of La-chlorapatite

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	0	2	199.2	210.2	0	-6	1	53.7	52.0	2	6	1	127.2	128.1
0	0	4	371.9	395.0	-4	4	0	33.9	35.2	3	-10	1	126.9	127.6
0	0	6	195.2	194.3	2	4	0	34.0	35.1	-3	4	3	165.3	164.0
0	0	8	157.8	138.3	2	-8	0	36.7	38.1	2	2	3	163.7	162.9
0	-1	2	27.4	24.8	-4	6	0	38.8	39.7	1	-6	3	162.1	161.2
-1	1	2	28.4	27.0	3	2	0	36.5	37.3	-3	2	3	131.0	130.5
1	-3	4	32.2	33.3	1	-8	0	37.7	38.4	1	4	3	130.1	129.7
1	-3	2	23.9	26.8	-4	2	0	185.9	177.5	2	-6	3	127.3	127.0
1	1	2	31.6	31.2	1	6	0	184.1	175.9	-5	2	0	126.4	128.4
0	-3	4	38.0	35.5	3	-8	0	182.3	174.1	1	8	0	129.6	131.6
0	-3	2	28.4	28.3	-3	4	2	17.5	14.7	4	-10	0	131.3	133.9
-2	1	4	35.9	40.4	2	2	2	19.9	16.6	-5	8	0	187.1	186.6
-2	3	2	37.1	37.1	1	-6	2	20.1	16.9	4	2	0	185.0	184.3
2	-5	4	32.7	39.9	-3	2	2	103.0	100.1	1	-10	0	190.1	189.6

Rare Earth Elements in Chlorapatite [Ca10(PO4)6(Cl)2]:

2	-5	2	30.2	34.4	1	4	2	101.5	98.5	-4	8	2	104.7	106.2
1	3	4	35.4	41.7	2	-6	2	101.5	98.4	4	0	2	102.1	103.6
1	3	2	35.1	37.3	-4	4	1	12.8	14.0	0	-8	2	103.8	105.2
1	-5	2	37.4	39.4	2	4	1	14.2	15.8	-3	6	3	48.0	47.5
2	1	2	44.2	43.1	2	-8	1	14.9	16.4	3	0	3	50.7	50.5
0	-5	2	35.6	37.6	-4	6	1	14.6	12.6	0	-6	3	50.8	50.1
-3	3	4	33.8	38.8	3	2	1	16.9	14.2	-5	10	0	29.1	27.3
-3	5	2	30.8	29.9	1	-8	1	19.4	16.5	5	0	0	27.9	26.1
-4	5	4	36.4	38.8	-4	2	1	85.9	87.6	0	-10	0	27.7	25.8
-5	7	2	35.1	40.1	1	6	1	85.0	86.7	-5	6	2	79.5	80.4
-1	2	0	27.7	28.3	3	-8	1	85.8	87.5	3	4	2	77.6	78.5
1	0	0	27.6	28.3	-3	6	2	81.0	79.5	2	-10	2	78.8	79.9
0	-2	0	27.1	27.7	3	0	2	78.8	77.2	-5	4	2	27.1	27.3
-1	2	1	32.4	32.7	0	-6	2	80.4	78.9	2	6	2	29.6	30.1
1	0	1	31.0	31.3	-4	8	0	54.1	55.7	3	-10	2	27.3	27.4
0	-2	1	31.6	31.9	4	0	0	57.4	59.1	-1	2	4	46.6	46.2
-2	4	0	8.3	7.8	0	-8	0	54.8	56.3	1	0	4	47.7	47.2
2	0	0	8.5	7.9	-2	2	3	86.6	85.0	0	-2	4	45.4	45.0
0	-4	0	10.4	9.8	1	2	3	84.9	82.9	-5	10	1	68.0	67.7
-2	2	1	26.0	27.1	1	-4	3	84.4	82.7	5	0	1	67.0	66.5
1	2	1	25.4	26.3	-4	8	1	27.0	27.7	0	-10	1	66.5	65.8
1	-4	1	24.3	25.2	4	0	1	25.3	26.0	-4	2	3	77.7	78.4
-2	4	1	46.1	45.4	0	-8	1	23.2	23.8	1	6	3	78.4	78.8
2	0	1	45.3	44.8	-2	4	3	55.7	54.0	3	-8	3	78.9	79.4
0	-4	1	46.1	45.5	2	0	3	52.1	50.6	-4	6	3	79.4	78.8
-3	4	0	83.8	87.0	0	-4	3	52.2	50.5	3	2	3	84.1	83.1
2	2	0	83.3	86.5	-4	4	2	231.9	230.6	1	-8	3	82.5	81.8
1	-6	0	85.3	88.5	2	4	2	232.9	231.4	-6	6	0	78.7	77.1
-3	4	1	194.3	196.9	2	-8	2	235.5	234.1	3	6	0	76.4	74.9

2	2	1	195.0	197.4	-5	6	0	29.5	29.9	3-12	0	78.8	77.8	
1	-6	1	196.3	198.6	3	4	0	29.9	30.4	-5	8	2	71.3	71.7
-3	2	1	136.1	138.3	2-10	0	30.3	30.5	4	2	2	69.4	69.4	
1	4	1	137.7	139.8	-5	4	0	118.0	116.5	1-10	2	72.6	72.9	
2	-6	1	137.7	139.7	2	6	0	119.7	118.2	-5	2	2	58.1	59.1
-3	6	0	317.3	309.5	3-10	0	120.3	119.1	1	8	2	58.6	59.8	
3	0	0	314.7	307.2	-4	2	2	57.7	56.4	4-10	2	59.0	60.3	
0	-6	0	314.9	307.6	1	6	2	57.5	56.2	-6	4	0	115.7	114.9
-2	2	2	220.2	223.2	3	-8	2	58.6	57.2	2	8	0	114.8	114.3
1	2	2	220.6	223.6	-4	6	2	75.6	74.4	4-12	0	116.8	116.0	
1	-4	2	221.5	224.5	3	2	2	75.8	74.6	-6	8	0	21.5	21.7
-2	4	2	76.3	75.8	1	-8	2	76.4	75.3	4	4	0	20.4	20.0
2	0	2	75.3	74.7	-5	6	1	104.3	104.4	2-12	0	21.9	21.9	
0	-4	2	75.6	75.1	3	4	1	102.4	102.6	-6	6	1	79.4	81.2
-3	6	1	53.4	51.6	2-10	1	103.2	103.5	3	6	1	78.3	79.8	
3	0	1	54.5	52.5	-5	4	1	128.7	129.3	3-12	1	77.5	79.0	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-6	8	1	60.3	61.1	0-12	1	28.3	25.8	1	4	5	76.5	73.8	
4	4	1	63.4	64.0	-7	8	1	84.6	85.9	2	-6	5	77.3	74.9
2-12	1	60.6	61.2	4	6	1	84.4	85.8	-7	10	2	53.3	56.3	
-6	4	1	62.1	62.8	3-14	1	83.2	84.5	5	4	2	52.4	55.0	
2	8	1	62.9	63.6	-7	10	0	152.5	150.9	2-14	2	57.7	61.3	
4-12	1	65.9	66.6	5	4	0	150.9	149.1	-7	4	2	161.7	161.8	
-6	10	0	88.2	88.5	2-14	0	154.3	152.7	2	10	2	163.4	163.8	
5	2	0	83.0	83.3	-7	4	0	94.0	92.9	5-14	2	168.4	169.1	
1-12	0	87.2	87.4	2	10	0	95.9	95.0	-5	8	4	99.9	100.2	
-5	10	2	107.5	106.6	5-14	0	96.9	96.0	4	2	4	98.9	99.1	
5	0	2	106.0	104.6	-4	8	4	25.9	27.4	1-10	4	101.3	101.6	

0-10	2	107.0	106.1	4	0	4	29.0	30.9	-5	2	4	92.3	93.1	
-3	4	4	59.1	58.9	0	-8	4	26.1	27.6	1	8	4	94.9	95.9
2	2	4	57.5	57.2	-7	10	1	66.2	66.1	4-10	4	96.1	97.3	
1	-6	4	58.7	58.5	5	4	1	67.3	67.6	-8	8	0	148.1	146.8
-3	2	4	81.7	81.0	2-14	1	65.3	65.3	4	8	0	149.7	148.3	
1	4	4	80.1	79.5	-6	6	3	30.3	29.1	4-16	0	158.6	157.6	
2	-6	4	81.5	81.1	3	6	3	30.7	30.1	-8	6	0	74.5	71.9
-6	10	1	143.2	143.4	3-12	3	34.9	33.8	3	10	0	80.0	77.6	
5	2	1	145.6	145.6	-2	2	5	23.0	26.6	5-16	0	75.2	72.1	
1-12	1	145.7	145.9	1	2	5	23.4	26.9	-7	14	0	31.0	30.6	
-6	2	1	57.8	60.1	1	-4	5	20.6	23.8	7	0	0	38.1	38.1
1	10	1	59.1	61.3	-6	4	3	97.5	96.6	0-14	0	32.4	32.2	
5-12	1	59.1	61.3	2	8	3	93.6	93.2	-7	2	2	68.2	68.9	
-5	6	3	101.8	102.3	4-12	3	90.5	90.1	1	12	2	67.6	68.0	
3	4	3	105.6	105.6	-6	8	3	55.5	56.8	6-14	2	66.5	66.9	
2-10	3	106.6	106.7	4	4	3	54.1	56.0	-5	10	4	36.9	36.4	
-5	4	3	34.0	33.9	2-12	3	52.2	53.7	5	0	4	36.7	36.5	
2	6	3	35.8	35.4	-2	4	5	38.8	40.9	0-10	4	37.9	37.3	
3-10	3	37.2	37.0	2	0	5	37.0	39.3	-8	8	1	65.7	67.5	
-6	6	2	98.5	99.6	0	-4	5	39.2	41.8	4	8	1	64.2	66.4
3	6	2	97.6	98.6	-6	12	2	101.5	101.0	4-16	1	67.1	69.1	
3-12	2	100.7	102.3	6	0	2	95.9	94.9	-6	12	3	53.5	52.9	
-3	6	4	148.7	147.9	0-12	2	98.7	98.3	6	0	3	55.0	54.9	
3	0	4	146.4	145.6	-7	12	0	59.9	61.7	0-12	3	57.3	56.7	
0	-6	4	147.5	147.0	6	2	0	59.1	60.5	-7	8	3	105.5	106.0
-6	8	2	101.4	102.0	1-14	0	59.4	61.3	4	6	3	108.2	108.2	
4	4	2	98.3	98.8	-7	2	0	56.0	57.1	3-14	3	109.1	109.6	
2-12	2	97.5	97.9	1	12	0	54.7	56.1	-4	2	5	54.6	53.7	
-6	4	2	76.3	75.2	6-14	0	57.3	58.8	1	6	5	52.7	52.6	

2	8	2	78.7	77.7	-7	6	2	119.9	120.8	3	-8	5	51.1	50.9
4-12	2		73.8	72.5	3	8	2	122.1	123.1	-6	6	4	49.5	50.2
-5	2	3	33.8	34.1	4-14	2		124.9	126.1	3	6	4	50.5	51.4
1	8	3	34.2	35.3	-5	4	4	74.5	74.1	3-12	4		54.1	55.3
4-10	3		36.0	37.0	2	6	4	78.8	78.2	-8	4	0	30.0	32.3
-6	12	0	44.6	47.9	3-10	4		75.8	75.3	2	12	0	35.1	37.9
6	0	0	38.8	40.7	-7	2	1	36.9	40.6	6-16	0		36.5	39.9
0-12	0		42.8	45.9	1	12	1	39.2	42.9	-6	4	4	98.1	96.2
-7	6	0	85.8	87.3	6-14	1		39.3	43.0	2	8	4	96.7	94.8
3	8	0	82.5	83.9	-6	10	3	118.5	118.4	4-12	4		96.8	95.2
4-14	0		82.1	83.5	5	2	3	117.2	117.7	-6	8	4	89.7	88.9
-7	8	0	30.8	29.4	1-12	3		116.5	116.5	4	4	4	89.3	88.3
4	6	0	29.8	28.5	-6	2	3	38.7	40.9	2-12	4		88.6	88.0
3-14	0		37.1	35.4	1	10	3	37.5	40.0	-7	10	3	77.0	75.4
-6	10	2	97.2	98.6	5-12	3		33.4	35.7	5	4	3	77.7	75.4
5	2	2	97.7	99.5	-3	4	5	115.7	113.7	2-14	3		75.3	73.8
1-12	2		94.5	95.9	2	2	5	117.5	115.4	-4	8	5	28.1	27.4
-6	12	1	29.1	26.4	1	-6	5	118.8	116.9	4	0	5	24.8	24.9
6	0	1	27.6	24.7	-3	2	5	73.7	71.6	0	-8	5	25.4	25.1
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-7	14	2	73.3	74.9	4-18	1		38.5	38.1	1	6	6	86.7	88.6
7	0	2	66.5	67.8	-9	8	1	53.7	54.4	3	-8	6	86.5	88.4
0-14	2		70.9	72.7	4	10	1	51.8	52.5	-9	14	1	37.3	41.0
-8	10	2	34.0	35.2	5-18	1		51.1	51.7	7	4	1	34.9	38.8
5	6	2	35.9	36.9	-8	10	3	37.6	41.9	2-18	1		35.8	39.3
3-16	2		35.6	36.8	5	6	3	34.2	38.4	-9	4	1	31.8	36.3
-8	6	2	107.8	105.1	3-16	3		33.2	37.2	2	14	1	29.4	33.5
3	10	2	104.3	101.8	-7	14	3	37.6	38.5	7-18	1		28.6	32.9

5-16	2	105.0	102.9	7	0	3	45.2	46.2	-6	10	5	102.1	102.0	
-6	2	4	24.3	22.8	0-14	3	44.6	45.8	5	2	5	106.1	105.5	
1	10	4	25.5	24.0	-5	10	5	49.8	52.7	1-12	5	106.9	106.7	
5-12	4	27.6	26.4	5	0	5	46.7	50.0	-6	2	5	34.2	37.6	
-6	10	4	108.1	106.3	0-10	5	46.0	48.7	1	10	5	37.0	40.4	
5	2	4	101.7	99.9	-8	14	2	82.2	82.9	5-12	5	38.9	42.2	
1-12	4	106.9	105.2	7	2	2	76.4	76.6	-9	6	2	107.8	107.7	
-1	2	6	38.8	40.0	1-16	2	82.9	83.8	3	12	2	110.5	110.6	
1	0	6	37.0	38.6	-7	10	4	78.5	79.5	6-18	2	113.2	114.0	
0	-2	6	40.8	42.4	5	4	4	75.7	76.3	-9	12	2	131.1	131.0
-7	2	3	30.9	30.6	2-14	4	78.5	79.7	6	6	2	130.0	129.7	
1	12	3	31.3	31.7	-3	6	6	24.8	24.5	3-18	2	133.6	133.9	
6-14	3	29.1	29.1	3	0	6	24.8	24.8	-8	16	2	104.8	106.8	
-8	14	0	95.8	94.7	0	-6	6	23.2	22.8	8	0	2	106.3	107.9
7	2	0	92.3	90.4	-8	16	0	115.1	114.2	0-16	2	103.9	105.7	
1-16	0	98.1	96.7	8	0	0	114.0	113.5	-8	2	3	51.3	54.2	
-8	2	0	131.6	127.0	0-16	0	115.9	115.3	1	14	3	49.5	53.0	
1	14	0	134.6	130.1	-9	12	1	123.9	124.2	7-16	3	54.8	58.3	
7-16	0	136.0	131.8	6	6	1	121.3	121.2	-4	8	6	76.6	74.9	
-5	4	5	100.3	99.3	3-18	1	119.5	119.7	4	0	6	76.4	74.6	
2	6	5	98.2	97.9	-9	6	1	40.1	45.4	0	-8	6	77.4	75.6
3-10	5	97.6	97.2	3	12	1	38.1	43.1	-8	8	4	122.2	120.1	
-5	6	5	58.8	58.6	6-18	1	36.5	41.2	4	8	4	121.4	119.2	
3	4	5	55.8	56.0	-6	6	5	57.9	59.0	4-16	4	126.5	124.6	
2-10	5	54.6	54.5	3	6	5	57.5	57.6	-9	16	0	36.6	37.3	
-2	2	6	123.3	118.2	3-12	5	56.6	57.4	8	2	0	45.9	47.7	
1	2	6	124.4	119.0	-6	8	5	29.6	31.1	1-18	0	38.5	39.7	
1	-4	6	125.5	120.5	4	4	5	35.1	36.5	-9	2	0	28.8	31.3
-8	12	2	34.1	39.2	2-12	5	32.9	34.4	1	16	0	34.9	37.7	

6	4	2	28.5	32.8	-6	4	5	45.6	43.9	8-18	0	31.4	34.4	
2-16	2	34.1	39.0	2	8	5	47.5	45.4	-9	4	2	28.8	28.8	
-8	14	1	26.8	29.2	4-12	5	52.0	50.0	2	14	2	34.7	34.9	
7	2	1	27.5	30.1	-4	4	6	92.9	92.8	7-18	2	29.5	29.4	
1-16	1	30.3	32.8	2	4	6	93.1	93.0	-8	6	4	52.2	51.5	
-2	4	6	40.5	42.8	2	-8	6	95.3	95.0	3	10	4	56.7	56.0
2	0	6	40.2	42.5	-9	14	0	24.2	30.0	5-16	4	50.8	49.8	
0	-4	6	40.7	43.1	7	4	0	28.5	34.5	-5	6	6	62.3	63.4
-6	12	4	33.2	37.2	2-18	0	28.5	35.1	3	4	6	60.9	61.8	
6	0	4	28.8	31.9	-9	4	0	50.8	52.2	2-10	6	62.9	64.3	
0-12	4	33.0	37.1	2	14	0	49.1	51.0	-10	10	0	69.5	72.1	
-7	6	4	61.0	62.8	7-18	0	50.1	52.1	5	10	0	69.8	72.2	
3	8	4	56.3	57.6	-7	12	4	44.2	44.5	5-20	0	73.4	77.0	
4-14	4	57.0	58.4	6	2	4	47.9	48.3	-7	8	5	45.2	46.4	
-7	8	4	34.9	38.4	1-14	4	47.8	48.2	4	6	5	42.3	44.1	
4	6	4	33.3	36.7	-7	2	4	83.0	83.7	3-14	5	42.6	44.2	
3-14	4	38.2	42.0	1	12	4	78.7	79.3	-10	8	0	34.9	40.7	
-3	2	6	28.5	30.6	6-14	4	80.9	81.6	4	12	0	29.1	33.8	
1	4	6	32.1	34.4	-4	6	6	28.2	30.0	6-20	0	37.4	43.3	
2	-6	6	30.7	33.2	3	2	6	29.9	32.0	-8	4	4	51.0	52.3
-9	10	1	34.8	34.5	1	-8	6	29.3	31.2	2	12	4	58.1	59.7
5	8	1	37.1	36.4	-4	2	6	88.7	90.7	6-16	4	57.5	59.2	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-10	10	1	60.5	64.2	0-16	4	71.6	72.9	4	10	5	41.1	42.8	
5	10	1	60.8	64.4	-10	10	3	50.5	53.7	5-18	5	39.1	40.6	
5-20	1	60.3	64.1	5	10	3	51.0	53.5	-9	12	5	94.6	91.9	
-9	12	3	92.5	93.0	5-20	3	49.1	52.1	6	6	5	92.5	88.7	
6	6	3	92.4	93.4	-10	4	2	93.8	89.5	3-18	5	88.4	85.6	

3-18	3	95.9	96.4	2	16	2	98.2	94.3	-9	6	5	41.1	42.7	
-7	10	5	40.4	39.5	8-20	2	102.6	98.7	3	12	5	40.7	41.2	
5	4	5	41.2	40.9	-6	12	6	67.2	65.7	6-18	5	36.7	37.8	
2-14	5	42.1	41.2	6	0	6	65.2	63.2	-11	6	2	38.1	36.1	
-10	14	0	42.2	44.1	0-12	6	66.0	64.5	3	16	2	31.2	29.5	
7	6	0	35.0	36.2	-11	10	0	60.8	63.8	8-22	2	35.1	33.7	
3-20	0	42.6	44.3	5	12	0	66.4	69.7	-7	14	6	53.2	54.7	
-10	6	0	41.7	38.1	6-22	0	67.0	71.0	7	0	6	47.6	48.6	
3	14	0	32.1	29.1	-9	4	4	55.5	52.7	0-14	6	53.9	55.3	
7-20	0	32.4	29.5	2	14	4	52.0	49.4	-8	6	6	82.9	82.2	
-5	10	6	69.8	68.5	7-18	4	54.3	52.1	3	10	6	79.3	78.4	
5	0	6	67.9	66.5	-7	6	6	82.2	79.8	5-16	6	81.5	80.9	
0-10	6	66.5	65.1	3	8	6	86.5	84.6	-3	2	8	61.2	66.0	
-9	4	3	38.4	40.8	4-14	6	86.8	84.9	1	4	8	60.8	65.9	
2	14	3	40.0	42.5	-11	10	1	62.5	63.1	2	-6	8	61.2	66.0
7-18	3	44.9	47.5	5	12	1	65.3	66.0	-3	4	8	44.3	46.8	
-10	10	2	80.0	80.3	6-22	1	65.8	66.3	2	2	8	41.5	42.9	
5	10	2	77.1	77.3	-10	14	3	45.1	48.9	1	-6	8	42.8	44.7
5-20	2	84.0	84.8	7	6	3	48.6	52.2	-11	4	1	68.2	72.7	
-8	14	4	48.8	50.5	3-20	3	50.3	54.2	2	18	1	67.6	71.5	
7	2	4	46.6	47.9	-11	14	0	74.6	71.4	9-22	1	69.1	73.2	
1-16	4	50.1	51.9	7	8	0	73.3	69.8	-10	18	3	61.3	61.9	
-8	2	4	105.9	104.5	4-22	0	82.3	79.4	9	2	3	57.2	58.7	
1	14	4	107.3	106.0	-11	8	0	100.9	96.3	1-20	3	58.4	59.7	
7-16	4	108.4	107.4	4	14	0	103.3	99.5	-10	2	3	40.7	42.6	
-3	4	7	74.4	71.5	7-22	0	110.2	106.3	1	18	3	40.0	42.6	
2	2	7	72.9	70.8	-5	6	7	50.4	49.5	9-20	3	37.0	39.3	
1	-6	7	73.3	71.0	3	4	7	52.1	50.7	-6	10	7	69.1	67.3
-3	2	7	68.6	67.3	2-10	7	51.4	50.2	5	2	7	66.3	64.8	

1	4	7	67.8	66.1	-5	4	7	35.8	37.5	1-12	7	66.2	64.2	
2	-6	7	65.4	64.0	2	6	7	35.7	36.5	-3	6	8	64.6	58.5
-6	6	6	56.7	55.1	3-10	7	36.5	37.9	3	0	8	63.5	58.0	
3	6	6	56.7	55.6	-7	4	6	40.9	42.9	0	-6	8	63.9	58.4
3-12	6	59.4	58.3	2	10	6	42.1	44.0	-10	16	4	49.7	52.2	
-9	18	1	49.0	51.3	5-14	6	44.9	47.2	8	4	4	46.4	48.1	
9	0	1	47.6	49.6	-9	18	3	57.2	58.8	2-20	4	50.7	53.6	
0-18	1	47.4	49.5	9	0	3	57.3	59.2	-12	14	1	48.1	43.1	
-10	16	0	77.6	74.4	0-18	3	58.5	59.6	7	10	1	47.6	43.5	
8	4	0	75.4	71.8	-11	6	0	45.2	45.4	5-24	1	44.6	40.0	
2-20	0	80.1	77.0	3	16	0	51.4	51.7	-11	2	0	73.4	71.4	
-10	4	0	44.9	47.0	8-22	0	45.5	44.9	1	20	0	80.4	79.5	
2	16	0	46.5	49.0	-11	10	2	45.0	45.6	10-22	0	78.4	77.2	
8-20	0	50.7	54.2	5	12	2	37.5	37.5	-7	8	7	51.8	54.0	
-8	8	5	49.3	51.3	6-22	2	38.9	38.8	4	6	7	53.1	54.7	
4	8	5	46.9	50.1	-10	4	3	33.0	31.9	3-14	7	54.2	55.9	
4-16	5	51.7	54.1	2	16	3	33.9	33.6	-12	16	0	72.3	70.0	
-9	18	2	78.9	75.9	8-20	3	35.7	34.9	8	8	0	80.3	77.8	
9	0	2	73.9	70.6	-1	2	8	32.8	35.6	4-24	0	70.8	68.0	
0-18	2	77.9	75.2	1	0	8	34.6	37.5	-11	20	1	58.5	61.8	
-4	2	7	49.0	48.5	0	-2	8	32.3	35.3	10	2	1	59.4	62.4
1	6	7	49.4	48.9	-11	16	1	39.3	38.8	1-22	1	60.7	63.5	
3	-8	7	50.5	50.1	8	6	1	42.8	42.3	-10	10	5	48.9	48.1
-8	16	4	70.2	71.6	3-22	1	42.9	42.1	5	10	5	48.9	49.1	
8	0	4	69.1	70.7	-9	8	5	45.0	46.2	5-20	5	50.3	49.8	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-12	8	1	45.2	42.3	6-18	6	79.0	78.6	8	10	0	55.4	58.0	
4	16	1	45.3	42.5	-9	12	6	80.7	79.7	5-26	0	60.5	64.8	

8-24	1	42.8	40.2	6	6	6	82.9	81.7	-11	10	5	49.8	51.7	
-7	10	7	40.6	41.4	3-18	6	86.5	85.5	5	12	5	54.6	56.0	
5	4	7	42.9	42.4	-12	16	2	57.4	64.6	6-22	5	54.1	55.4	
2-14	7	39.8	40.2	8	8	2	47.5	52.8	-3	4	9	63.5	63.3	
-12	12	2	51.5	55.4	4-24	2	57.0	64.3	2	2	9	63.9	64.0	
6	12	2	52.1	56.0	-12	8	2	47.2	45.7	1	-6	9	63.5	63.7
6-24	2	58.2	63.9	4	16	2	57.3	55.3	-12	22	0	44.4	51.1	
-11	10	4	55.9	55.4	8-24	2	54.4	53.2	11	2	0	54.3	63.8	
5	12	4	64.1	63.9	-5	2	8	48.6	44.2	1-24	0	44.0	50.3	
6-22	4	63.9	64.1	1	8	8	50.2	45.7	-11	2	4	55.1	54.3	
-5	4	8	41.6	42.5	4-10	8	53.0	48.4	1	20	4	60.8	60.6	
2	6	8	48.5	50.2	-8	16	6	100.4	96.0	10-22	4	60.9	60.8	
3-10	8	45.0	46.3	8	0	6	103.3	98.6	-9	12	7	68.7	68.4	
-11	4	3	58.9	57.7	0-16	6	99.6	95.5	6	6	7	66.2	67.2	
2	18	3	56.8	55.7	-12	18	2	53.4	55.5	3-18	7	68.5	68.4	
9-22	3	56.9	55.9	9	6	2	51.2	52.6	-7	2	8	63.2	65.5	
-12	6	0	55.6	52.5	3-24	2	57.0	59.9	1	12	8	57.3	58.7	
3	18	0	59.4	56.5	-11	20	3	70.3	69.5	6-14	8	60.2	62.1	
9-24	0	63.8	61.5	10	2	3	66.7	65.3	-11	4	5	57.7	57.4	
-11	20	2	58.1	62.0	1-22	3	65.9	65.4	2	18	5	58.2	57.0	
10	2	2	51.3	53.7	-6	8	8	78.3	76.7	9-22	5	60.1	58.7	
1-22	2	57.3	61.4	4	4	8	79.9	78.7	-12	24	0	70.9	77.1	
-11	14	4	57.2	59.6	2-12	8	77.3	76.4	12	0	0	65.1	70.2	
7	8	4	54.8	57.0	-6	4	8	68.2	68.7	0-24	0	70.3	76.5	
4-22	4	61.1	64.2	2	8	8	67.3	67.2	-8	8	8	62.5	66.1	
-11	8	4	79.1	80.4	4-12	8	66.3	66.8	4	8	8	61.0	64.4	
4	14	4	80.3	81.7	-6	10	8	78.4	80.3	4-16	8	64.9	68.8	
7-22	4	84.3	86.2	5	2	8	71.4	72.4	-14	10	1	54.0	61.4	
-9	6	6	74.2	73.2	1-12	8	76.0	77.8	5	18	1	54.9	62.2	

3 12 6 75.3 74.7 -13 16 0 56.4 59.6 9-28 1 55.3 62.6

Rare Earth Elements in Chlorapatite [Ca₁₀(PO₄)₆(Cl)₂]:

Uptake, Site Preference and
Degradation of Monoclinic Structure

Michael E. Fleet, Xiaoayang Liu
and Yuanming Pan

Deposited Material

Table 5. List of observed and calculated structure factors

(f) *P*2₁/*b* structure of Dy-hydroxylapatite

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	0	2	281.0	284.8	2	2	1	207.2	208.8	-4	4	2	204.3	205.3
0	0	4	390.1	409.0	1	-6	1	197.1	198.7	2	4	2	196.3	197.7

0	0	6	204.0	204.9	-3	2	1	136.3	137.0	2	-8	2	209.0	210.7
0	0	8	175.5	177.5	1	4	1	131.9	132.8	-4	6	2	77.5	77.9
0	0	10	83.1	84.1	2	-6	1	141.7	142.1	3	2	2	84.1	84.2
0	0	12	121.5	115.2	-2	2	2	171.7	173.8	1	-8	2	106.5	105.6
0	-1	2	17.0	14.5	1	2	2	173.9	175.5	-4	2	2	109.7	107.1
-1	1	4	17.5	12.2	1	-4	2	174.9	176.6	1	6	2	114.1	111.2
1	1	3	19.1	23.6	-3	6	0	264.2	272.3	3	-8	2	107.7	105.8
0	-3	3	22.6	20.4	3	0	0	268.8	275.9	-5	6	0	14.5	14.1
-2	3	4	20.4	23.7	0	-6	0	280.5	288.1	3	4	0	25.8	24.6
-2	3	2	18.3	22.8	-2	4	2	120.9	117.6	2-10	0	0.8	1.5	
1	3	3	17.9	2.0	2	0	2	122.2	119.3	-5	4	0	116.4	115.9
1	-5	2	20.2	22.3	0	-4	2	112.7	110.8	2	6	0	114.1	114.0
2	1	4	17.6	20.8	-3	6	1	68.2	66.2	3-10	0	102.2	104.1	
2	1	2	26.8	26.3	3	0	1	51.2	50.5	-3	4	3	193.2	190.7
0	-5	2	19.1	24.9	0	-6	1	48.0	46.9	2	2	3	201.4	197.6
-3	1	2	13.6	15.2	-4	4	0	20.7	26.5	1	-6	3	200.5	196.3
-3	3	3	25.5	30.5	2	4	0	12.7	16.7	-3	2	3	134.7	132.9
-3	5	4	14.9	15.4	2	-8	0	5.2	6.5	1	4	3	137.9	134.9
-3	5	1	16.9	23.4	-3	4	2	61.6	59.2	2	-6	3	127.0	125.4
3	-7	6	27.7	24.6	2	2	2	62.7	59.7	-5	6	1	134.0	133.9
3	1	4	20.0	23.1	1	-6	2	50.2	48.0	3	4	1	130.9	130.9
4	-9	4	27.7	27.7	-3	2	2	44.7	40.3	2-10	1	111.7	112.4	
2	5	1	30.5	35.8	1	4	2	42.0	38.1	-5	4	1	120.0	119.7
3	3	3	26.4	23.1	2	-6	2	38.0	34.6	2	6	1	115.6	115.6
0	-9	4	22.3	15.3	-4	6	0	69.9	73.7	3-10	1	129.9	129.3	
0	-9	1	28.2	31.5	3	2	0	93.3	96.2	-5	8	0	146.4	150.9
-5	5	1	27.6	33.8	1	-8	0	92.8	94.8	4	2	0	132.2	136.0
-5	7	2	25.7	25.7	-4	2	0	184.2	178.2	1-10	0	131.6	136.4	
5	1	1	27.2	35.8	1	6	0	180.8	175.1	-5	2	0	156.6	159.3

-1	2	0	35.6	37.3	3	-8	0	195.2	187.3	1	8	0	146.4	148.3
1	0	0	36.5	37.9	-4	4	1	40.9	43.2	4	-10	0	148.3	152.1
0	-2	0	31.8	33.7	2	4	1	36.8	38.1	-4	8	2	157.1	158.0
-1	2	1	28.6	28.0	2	-8	1	36.1	37.7	4	0	2	153.5	153.8
1	0	1	20.3	20.5	-1	2	3	16.1	15.0	0	-8	2	150.9	152.0
0	-2	1	22.0	22.0	1	0	3	19.1	17.5	-3	6	3	44.2	44.2
-2	2	0	38.4	38.1	0	-2	3	23.9	21.1	3	0	3	50.3	49.4
1	2	0	29.2	29.8	-4	6	1	47.6	44.8	0	-6	3	39.0	38.7
1	-4	0	21.6	22.2	3	2	1	30.4	29.5	-5	8	1	28.7	28.8
-2	4	0	72.3	67.9	1	-8	1	41.2	39.1	4	2	1	32.8	32.9
2	0	0	51.7	50.3	-4	2	1	73.8	75.6	1	-10	1	24.8	25.5
0	-4	0	65.9	62.5	1	6	1	72.2	74.8	-5	2	1	18.3	18.3
-2	2	1	27.4	30.1	3	-8	1	52.5	54.9	1	8	1	23.7	24.0
1	2	1	29.9	32.4	-3	6	2	40.0	36.9	4	-10	1	15.1	15.6
1	-4	1	29.9	32.7	3	0	2	34.1	31.4	1	-2	4	47.7	45.4
-2	4	1	34.9	35.4	0	-6	2	24.1	22.6	-1	0	4	42.2	40.7
2	0	1	22.5	22.9	-2	2	3	81.8	77.2	0	2	4	43.7	42.0
0	-4	1	17.8	19.0	1	2	3	89.1	83.6	-5	4	2	20.2	21.2
-1	2	2	73.0	70.5	1	-4	3	85.7	80.4	2	6	2	11.1	12.1
1	0	2	64.6	62.5	-4	8	0	51.1	50.6	3	-10	2	10.0	12.2
0	-2	2	63.1	61.8	4	0	0	61.1	60.4	-5	6	2	107.9	112.2
-3	2	0	28.6	28.7	0	-8	0	78.5	75.1	3	4	2	101.1	104.4
1	4	0	27.2	26.8	-2	4	3	68.4	63.8	2	-10	2	105.5	110.2
2	-6	0	41.4	40.4	2	0	3	78.1	73.0	-5	10	0	14.4	14.1
-3	4	0	121.2	122.6	0	-4	3	72.1	67.9	5	0	0	37.8	37.2
2	2	0	117.8	118.6	-4	8	1	16.6	20.2	0	-10	0	22.4	21.5
1	-6	0	120.8	121.7	4	0	1	18.3	21.3	-2	2	4	16.7	15.0
-3	4	1	205.1	206.6	0	-8	1	5.1	6.0	1	2	4	15.4	13.6

	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
1	-4	4	10.3	10.1	1	10	1	51.9	53.2	-7	4	0	58.8	62.1	
-4	6	3	69.5	68.6	5	-12	1	70.2	70.9	2	10	0	64.3	67.6	
3	2	3	72.7	72.9	-6	6	2	65.7	67.9	5	-14	0	58.4	62.8	
1	-8	3	62.0	62.0	3	6	2	63.8	64.9	2	-4	5	29.7	30.0	
-4	2	3	55.5	55.6	3	-12	2	64.4	66.1	-2	0	5	22.3	22.8	
1	6	3	68.7	68.4	-6	8	2	47.8	47.4	0	4	5	27.3	27.9	
3	-8	3	61.8	62.1	4	4	2	56.4	56.2	-6	6	3	40.1	38.5	
-5	10	1	67.0	66.2	2	-12	2	45.5	45.2	3	6	3	42.5	40.4	
5	0	1	63.0	62.5	-6	4	2	40.2	39.7	3	-12	3	29.1	27.8	
0	-10	1	47.1	47.1	2	8	2	37.8	38.0	-7	10	1	68.7	69.1	
-2	4	4	27.7	28.1	4	-12	2	63.5	62.8	5	4	1	77.4	76.9	
2	0	4	23.0	22.8	-5	8	3	46.5	47.6	2	-14	1	92.6	93.0	
0	-4	4	23.5	23.9	4	2	3	37.0	38.9	-7	4	1	50.9	49.9	
-5	8	2	38.1	39.7	1	-10	3	48.1	48.7	2	10	1	63.0	61.4	
4	2	2	49.6	49.7	-5	2	3	52.3	51.5	5	-14	1	55.2	53.6	
1	-10	2	44.6	45.5	1	8	3	50.7	49.9	-6	4	3	111.7	114.0	
-6	6	0	42.6	43.0	4	-10	3	46.5	46.3	2	8	3	130.3	130.8	
3	6	0	63.1	61.2	-4	6	4	27.0	28.0	4	-12	3	106.1	107.8	
3	-12	0	74.0	74.4	3	2	4	33.6	34.7	-6	8	3	38.2	40.7	
-6	8	0	26.8	27.0	1	-8	4	34.0	34.6	4	4	3	31.9	33.7	
4	4	0	31.7	32.3	-4	2	4	16.8	19.9	2	-12	3	30.0	32.3	
2	-12	0	44.2	46.6	1	6	4	12.0	14.4	-5	4	4	68.1	67.7	
-6	4	0	153.2	155.5	3	-8	4	17.7	21.3	2	6	4	71.8	71.4	
2	8	0	145.8	147.7	-6	12	0	41.0	44.5	3	-10	4	77.4	77.3	
4	-12	0	148.7	150.6	6	0	0	29.7	31.2	-6	12	2	75.6	75.7	
-6	6	1	98.9	101.6	0	-12	0	33.6	36.6	6	0	2	68.8	67.7	
3	6	1	97.5	100.2	1	-2	5	11.4	12.2	0	-12	2	58.8	58.5	
3	-12	1	87.3	89.8	-1	0	5	14.4	15.0	-3	4	5	127.3	124.3	

-6	8	1	27.0	29.5	0	2	5	13.8	13.8	2	2	5	128.2	125.1
4	4	1	42.3	44.8	-6	10	2	57.1	56.7	1	-6	5	123.1	119.9
2-12	1		52.4	54.6	5	2	2	62.1	62.8	3	-2	5	82.9	80.9
-6	4	1	81.6	83.7	1-12	2		77.5	77.5	-1	-4	5	82.8	81.7
2	8	1	82.8	85.3	-6	2	2	52.4	52.7	-2	6	5	90.4	88.2
4-12	1		71.6	73.7	1	10	2	44.9	45.7	-7	6	2	95.5	96.8
-3	2	4	88.9	85.7	5-12	2		66.3	66.8	3	8	2	94.3	95.8
1	4	4	81.7	79.6	-7	8	0	53.9	57.3	4-14	2		110.2	110.8
2	-6	4	93.5	90.3	4	6	0	37.8	39.7	-7	8	2	10.2	11.0
-3	4	4	69.3	68.3	3-14	0		29.1	31.1	4	6	2	26.0	27.1
2	2	4	75.8	74.0	-7	6	0	23.2	23.2	3-14	2		32.5	34.0
1	-6	4	66.1	64.9	3	8	0	19.7	19.9	-7	12	0	81.9	83.7
-5	10	2	154.0	156.1	4-14	0		0.4	1.1	6	2	0	100.0	101.4
5	0	2	154.1	156.1	-5	10	3	8.1	10.5	1-14	0		105.1	106.5
0-10	2		150.7	152.5	5	0	3	26.8	29.6	-7	2	0	81.9	83.6
-6	10	0	86.0	88.6	0-10	3		31.5	34.8	1	12	0	83.7	85.7
5	2	0	88.2	88.8	-2	2	5	19.5	22.2	6-14	0		80.5	84.0
1-12	0		105.4	106.3	1	2	5	22.6	25.1	-5	8	4	99.6	97.1
-3	6	4	155.0	153.3	1	-4	5	27.4	30.0	4	2	4	93.4	90.2
3	0	4	144.9	143.4	-7	8	1	114.0	116.4	1-10	4		93.5	90.9
0	-6	4	158.2	156.5	4	6	1	116.1	118.1	-5	2	4	127.1	126.1
-5	6	3	137.0	136.0	3-14	1		117.0	118.7	1	8	4	115.0	113.7
3	4	3	135.6	134.9	-7	6	1	22.5	22.6	4-10	4		118.7	118.2
2-10	3		127.8	126.7	3	8	1	20.6	20.9	-6	10	3	138.3	137.8
-5	4	3	45.3	44.6	4-14	1		27.2	27.1	5	2	3	132.1	131.8
2	6	3	44.7	43.6	-4	8	4	36.3	35.4	1-12	3		128.4	128.7
3-10	3		52.6	52.4	4	0	4	41.8	41.1	-6	2	3	22.3	21.4
-6	10	1	145.0	145.1	0	-8	4	38.4	37.9	1	10	3	32.0	31.2

5	2	1	147.4	146.7	-7	10	0	128.2	131.0	5-12	3	27.2	26.8	
1-12	1		143.2	143.3	5	4	0	136.8	138.7	-3	6	5	23.3	27.5
-6	2	1	50.4	51.4	2-14	0		123.8	125.8	3	0	5	12.3	15.6
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	-6	5	15.6	18.5	1	0	6	32.2	32.0	-7	8	4	52.6	51.6
-7	12	1	45.6	46.8	0	-2	6	39.6	39.5	4	6	4	47.9	46.9
6	2	1	36.9	37.9	-7	10	3	81.0	80.5	3-14	4		31.5	32.3
1-14	1		31.3	31.8	5	4	3	71.3	71.6	-7	6	4	20.2	19.2
-7	2	1	40.8	41.2	2-14	3		93.1	91.9	3	8	4	20.8	20.1
1	12	1	46.7	47.0	-7	4	3	59.8	59.0	4-14	4		11.4	11.4
6-14	1		50.6	50.8	2	10	3	64.4	63.8	-5	10	5	45.0	45.4
-7	10	2	57.0	60.3	5-14	3		39.0	39.4	5	0	5	46.3	46.8
5	4	2	44.4	46.7	-8	4	0	49.2	50.0	0-10	5		37.1	38.8
2-14	2		70.2	73.8	2	12	0	40.5	40.9	-9	8	0	25.9	29.4
-7	4	2	158.0	159.5	6-16	0		52.7	55.8	4	10	0	30.5	34.6
2	10	2	143.0	144.7	-6	10	4	110.4	111.0	5-18	0		14.5	18.9
5-14	2		150.9	153.6	5	2	4	106.2	106.0	-7	10	4	62.7	64.2
-4	4	5	39.7	39.3	1-12	4		113.3	113.0	5	4	4	71.6	72.3
2	4	5	33.4	33.2	-6	2	4	20.3	20.3	2-14	4		48.8	50.1
2	-8	5	33.7	33.9	1	10	4	9.4	9.5	-7	14	3	56.2	56.5
-5	10	4	50.7	50.1	5-12	4		16.8	17.5	7	0	3	34.8	36.9
5	0	4	52.3	52.0	-2	2	6	155.2	151.3	0-14	3		37.5	38.3
0-10	4		47.4	46.6	1	2	6	148.4	144.8	-8	10	3	20.5	21.7
-8	8	0	155.6	157.8	1	-4	6	146.9	143.8	5	6	3	26.7	27.7
4	8	0	133.8	134.8	-8	8	2	49.7	48.2	3-16	3		29.2	30.0
4-16	0		133.9	137.3	4	8	2	43.7	43.6	-6	6	5	79.9	77.3
-4	6	5	31.8	33.5	4-16	2		51.7	49.7	3	6	5	73.5	72.4
3	2	5	17.2	20.3	-5	6	5	79.5	78.3	3-12	5		76.7	75.2
1	-8	5	14.6	17.9	3	4	5	81.8	80.3	-9	10	1	56.2	55.9

-4	2	5	49.1	48.5	2-10	5	72.6	71.9	5	8	1	56.1	55.7	
1	6	5	52.8	51.8	-5	4	5	90.8	90.3	4-18	1	68.8	68.2	
3	-8	5	41.4	40.5	2	6	5	93.0	92.3	-9	8	1	65.1	66.2
-7	2	2	51.4	52.4	3-10	5	106.7	105.2	4	10	1	56.5	57.4	
1	12	2	46.2	47.3	-2	4	6	17.0	17.9	5-18	1	44.6	45.4	
6-14	2	59.6	59.7	2	0	6	20.5	22.5	-4	4	6	113.4	111.3	
-8	10	0	35.2	37.8	0	-4	6	16.8	18.8	2	4	6	121.8	119.3
5	6	0	54.9	57.9	-7	14	2	69.1	70.5	2	-8	6	127.8	125.1
3-16	0	32.8	35.4	7	0	2	80.5	80.9	-8	14	2	76.0	78.8	
-8	6	0	68.8	68.0	0-14	2	85.4	85.5	7	2	2	82.1	82.1	
3	10	0	59.1	58.8	-8	10	2	109.7	111.2	1-16	2	80.1	81.3	
5-16	0	86.5	84.9	5	6	2	121.0	121.9	-8	2	2	52.1	51.8	
-8	8	1	66.1	68.0	3-16	2	111.0	112.6	1	14	2	39.7	40.2	
4	8	1	54.2	56.3	-8	6	2	126.8	126.6	7-16	2	48.5	47.2	
4-16	1	65.7	67.4	3	10	2	134.2	132.9	-9	6	0	33.6	36.4	
-6	6	4	52.8	51.9	5-16	2	126.8	126.6	3	12	0	32.3	35.0	
3	6	4	49.2	48.5	-7	2	3	44.9	45.8	6-18	0	9.8	9.5	
3-12	4	71.4	70.1	1	12	3	38.7	39.2	-6	8	5	10.2	12.5	
-7	8	3	128.4	129.5	6-14	3	38.1	38.6	4	4	5	21.9	26.6	
4	6	3	132.0	133.6	-8	14	0	47.4	47.8	2-12	5	28.2	33.1	
3-14	3	123.3	125.0	7	2	0	37.5	35.8	-6	4	5	59.7	59.7	
-8	10	1	19.0	22.2	1-16	0	44.0	42.8	2	8	5	63.9	64.4	
5	6	1	10.5	12.5	-8	2	0	152.0	153.1	4-12	5	48.5	48.7	
3-16	1	21.0	25.3	1	14	0	151.1	151.9	-4	2	6	98.8	96.9	
-6	4	4	106.2	106.2	7-16	0	134.2	137.1	1	6	6	102.7	100.5	
2	8	4	106.6	106.4	-3	2	6	19.3	19.9	3	-8	6	101.4	99.3
4-12	4	113.3	113.2	1	4	6	21.5	21.4	-8	16	0	116.2	114.2	
-6	8	4	79.9	80.5	2	-6	6	21.4	21.4	8	0	0	116.2	114.5

4	4	4	88.1	88.3	-8	12	2	80.9	84.3	0-16	0	108.0	106.7	
2-12	4		88.9	89.5	6	4	2	66.3	69.1	-9	12	1	98.7	96.9
-4	8	5	20.2	20.5	2-16	2		53.8	57.2	6	6	1	109.5	107.7
4	0	5	24.5	24.3	-6	12	4	46.6	45.5	3-18	1		108.8	106.3
0	-8	5	22.6	22.5	6	0	4	37.0	35.8	-9	6	1	54.5	55.6
-1	2	6	42.5	41.7	0-12	4		50.8	48.4	3	12	1	62.7	63.6
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
6-18	1		62.0	62.3	4	2	6	50.6	48.3	-6	6	6	84.1	81.9
-8	12	3	22.5	22.7	1-10	6		47.8	46.9	3	6	6	72.7	70.1
6	4	3	27.8	27.5	-5	2	6	25.4	25.2	3-12	6		73.1	71.6
2-16	3		26.1	25.2	1	8	6	25.7	25.4	-7	12	5	41.7	43.3
-7	12	4	72.9	73.0	4-10	6		20.1	20.8	6	2	5	28.9	30.2
6	2	4	68.1	67.6	-7	6	5	20.7	19.6	1-14	5		21.8	22.8
1-14	4		82.3	82.1	3	8	5	18.5	18.2	-7	2	5	21.8	23.1
-7	2	4	98.8	98.0	4-14	5		21.6	20.6	1	12	5	28.9	31.0
1	12	4	104.8	103.6	-7	8	5	71.6	72.7	6-14	5		28.7	30.8
6-14	4		90.0	89.7	4	6	5	70.6	71.2	-6	4	6	49.8	51.2
-6	10	5	113.8	110.6	3-14	5		79.8	80.6	2	8	6	40.9	41.8
5	2	5	112.1	110.0	-9	16	0	28.1	25.5	4-12	6		58.3	58.8
1-12	5		113.8	111.1	8	2	0	18.8	20.1	-9	2	2	74.9	73.5
-6	2	5	39.7	39.8	1-18	0		12.9	14.8	1	16	2	68.1	67.0
1	10	5	46.0	46.6	-9	10	3	48.6	49.3	8-18	2		87.7	86.6
5-12	5		53.2	53.4	5	8	3	51.2	51.2	-10	14	0	80.5	80.1
-4	8	6	78.7	75.9	4-18	3		40.1	40.5	7	6	0	81.1	79.8
4	0	6	84.7	81.7	-9	8	3	47.2	47.7	3-20	0		72.4	71.7
0	-8	6	88.8	85.8	4	10	3	45.1	46.1	-10	6	0	12.1	12.6
-9	10	2	43.4	47.6	5-18	3		39.6	40.0	3	14	0	14.9	15.8
5	8	2	33.4	35.3	-7	10	5	53.3	52.2	7-20	0		29.5	31.5
4-18	2		14.2	15.2	5	4	5	53.8	52.0	-8	14	4	32.1	33.2

-9	8	2	35.0	35.9	2-14	5	63.5	62.7	7	2	4	24.9	25.0	
4	10	2	24.5	25.2	-7	4	5	39.0	38.1	1-16	4	33.7	34.3	
5-18	2	49.9	51.4	2	10	5	47.2	46.6	-8	2	4	133.2	133.0	
-9	14	0	71.5	72.7	5-14	5	45.8	45.3	1	14	4	124.6	124.5	
7	4	0	70.4	71.6	-9	16	1	22.8	22.3	7-16	4	126.4	127.5	
2-18	0	74.1	75.4	8	2	1	18.5	18.3	-9	14	3	44.1	43.2	
-9	4	0	47.2	47.7	1-18	1	33.4	32.3	7	4	3	45.2	44.6	
2	14	0	55.1	55.9	-8	4	4	69.9	68.0	2-18	3	42.4	41.1	
7-18	0	58.6	59.9	2	12	4	68.2	66.3	-9	4	3	30.1	31.7	
-9	14	1	62.1	62.3	6-16	4	84.4	82.8	2	14	3	9.9	11.0	
7	4	1	54.5	54.5	-10	10	0	70.4	76.0	7-18	3	29.3	31.7	
2-18	1	54.3	53.9	5	10	0	74.5	78.5	-10	14	1	56.5	57.7	
-9	12	2	96.0	98.4	5-20	0	55.9	60.1	7	6	1	47.3	48.1	
6	6	2	99.7	101.1	-5	10	6	66.1	65.2	3-20	1	65.0	66.7	
3-18	2	86.8	89.6	5	0	6	80.4	80.0	-10	6	1	43.3	45.2	
-9	6	2	96.9	99.1	0-10	6	71.6	70.6	3	14	1	42.7	44.8	
3	12	2	106.4	108.0	-9	12	3	67.3	67.5	7-20	1	29.7	30.6	
6-18	2	111.2	114.5	6	6	3	69.3	68.1	-10	10	2	62.6	62.3	
-5	6	6	47.9	49.3	3-18	3	71.5	71.0	5	10	2	56.7	55.4	
3	4	6	36.5	37.1	-9	6	3	17.4	16.7	5-20	2	74.1	73.9	
2-10	6	44.0	45.2	3	12	3	24.4	22.9	-4	4	7	20.3	22.8	
-8	16	2	144.9	144.4	6-18	3	20.5	20.2	2	4	7	21.1	24.7	
8	0	2	140.2	139.5	-3	4	7	93.5	94.6	2	-8	7	11.1	12.2
0-16	2	153.1	152.9	2	2	7	92.3	92.6	-9	18	0	57.6	59.7	
-8	2	3	33.0	35.1	1	-6	7	87.7	88.1	9	0	0	53.0	53.1
1	14	3	48.3	49.0	-3	2	7	77.1	76.5	0-18	0	50.3	50.6	
7-16	3	15.4	18.2	1	4	7	74.7	73.2	-6	10	6	15.7	16.1	
-8	8	4	139.2	139.3	2	-6	7	67.0	66.1	5	2	6	23.2	25.4

4	8	4	135.2	134.1	-10	8	0	65.8	68.0	1-12	6	36.0	40.3	
4-16	4		134.8	135.2	4	12	0	62.9	64.7	-6	2	6	31.4	30.8
-8	10	4	36.2	39.1	6-20	0		48.9	51.1	1	10	6	21.7	21.6
5	6	4	47.8	51.3	-10	10	1	41.8	42.2	5-12	6	31.5	30.9	
3-16	4		24.2	25.8	5	10	1	60.4	60.0	-4	2	7	44.6	43.8
-8	6	4	49.7	48.8	5-20	1		61.5	61.2	1	6	7	38.5	38.1
3	10	4	53.7	53.5	-10	8	1	58.6	57.9	3	-8	7	42.4	42.6
5-16	4		60.7	59.5	4	12	1	58.9	58.0	-9	18	1	48.5	48.7
-5	8	6	45.4	44.1	6-20	1		57.2	56.0	9	0	1	40.4	41.3
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0-18	1		43.4	43.5	1	8	7	23.4	22.0	-10	4	3	32.6	35.5
-8	8	5	57.8	58.1	4-10	7		19.0	17.6	2	16	3	23.6	26.5
4	8	5	49.0	49.0	-1	2	8	22.6	22.4	8-20	3	51.1	54.6	
4-16	5		46.7	47.0	1	0	8	24.4	24.1	-6	8	7	18.6	19.1
-9	8	4	19.7	20.3	0	-2	8	28.3	26.8	4	4	7	24.0	23.4
4	10	4	24.2	24.3	-10	18	0	28.3	31.8	2-12	7	17.9	17.7	
5-18	4		9.4	9.8	9	2	0	39.5	42.2	-6	4	7	58.3	58.2
-10	16	0	61.8	62.8	1-20	0		43.0	47.3	2	8	7	58.7	57.6
8	4	0	68.2	68.6	-11	10	0	62.5	64.9	4-12	7	46.0	45.5	
2-20	0		68.8	70.5	5	12	0	47.6	48.7	-3	2	8	61.7	60.0
-10	4	0	25.6	28.1	6-22	0		89.0	92.4	1	4	8	59.7	58.8
2	16	0	19.1	21.7	-10	2	0	55.1	55.3	2	-6	8	62.6	60.9
8-20	0		28.3	31.7	1	18	0	74.0	73.3	-3	4	8	50.8	51.1
-10	16	1	39.5	39.8	9-20	0		47.1	48.4	2	2	8	47.0	47.4
8	4	1	35.6	36.2	-10	14	3	84.0	83.6	1	-6	8	41.1	40.9
2-20	1		19.0	20.2	7	6	3	68.9	68.7	-11	6	0	27.9	29.7
-10	4	1	41.3	41.2	3-20	3		76.7	75.5	3	16	0	39.3	40.7
2	16	1	28.0	28.8	-10	6	3	25.1	26.3	8-22	0	45.0	45.0	
8-20	1		40.1	39.9	3	14	3	15.6	15.0	-10	10	4	34.0	36.7

-8	16	4	89.1	86.5	7-20	3	18.1	18.6	5	10	4	33.1	34.2	
8	0	4	86.3	84.8	-10	18	1	41.2	38.0	5-20	4	24.6	27.3	
0-16	4		87.1	85.6	9	2	1	48.3	44.9	-9	12	5	79.3	77.0
-6	12	6	80.3	78.1	1-20	1		47.3	44.4	6	6	5	85.0	83.9
6	0	6	80.4	77.5	-11	12	1	57.1	56.3	3-18	5		89.7	87.4
0-12	6		79.6	76.6	6	10	1	55.6	55.0	-9	6	5	51.7	50.8
-9	18	2	52.4	55.8	5-22	1		64.9	64.6	3	12	5	55.4	55.4
9	0	2	39.1	40.0	-11	10	1	73.9	76.6	6-18	5		64.2	62.7
0-18	2		35.6	37.2	5	12	1	65.5	67.8	-11	16	1	36.2	35.4
-7	6	6	50.3	48.8	6-22	1		60.6	63.2	8	6	1	23.7	24.6
3	8	6	46.4	44.3	-11	14	0	61.8	63.3	3-22	1		41.8	41.7
4-14	6		49.7	48.4	7	8	0	49.8	48.6	-10	12	4	20.3	21.0
-10	10	3	46.7	46.6	4-22	0		64.6	66.1	6	8	4	18.2	17.5
5	10	3	45.8	45.4	-11	8	0	94.2	94.7	4-20	4		33.7	33.0
5-20	3		47.6	47.4	4	14	0	90.4	89.5	-10	8	4	47.2	48.6
-5	6	7	66.4	68.3	7-22	0		90.9	93.5	4	12	4	57.5	59.1
3	4	7	65.2	66.7	-7	12	6	20.1	20.3	6-20	4		33.0	33.7
2-10	7		58.8	59.9	6	2	6	31.4	33.4	-3	6	8	85.3	79.9
-5	4	7	51.2	52.4	1-14	6		21.1	22.1	3	0	8	84.5	79.0
2	6	7	44.5	45.1	-7	2	6	21.2	22.8	0	-6	8	91.6	85.6
3-10	7		53.1	54.4	1	12	6	15.5	15.7	-8	10	6	56.6	55.5
-10	8	3	48.0	46.9	6-14	6		25.6	28.7	5	6	6	73.9	72.1
4	12	3	46.6	46.2	-9	18	3	48.9	49.4	3-16	6		71.9	71.0
6-20	3		36.8	35.8	9	0	3	48.3	47.5	-8	6	6	85.5	84.9
-9	14	4	58.2	59.1	0-18	3		41.4	41.0	3	10	6	80.8	79.3
7	4	4	72.2	73.2	-11	14	1	36.0	37.6	5-16	6		89.1	89.0
2-18	4		61.2	62.3	7	8	1	46.8	48.7	-7	14	6	28.1	29.4
-9	4	4	41.4	38.8	4-22	1		41.8	43.2	7	0	6	28.1	28.1

2	14	4	47.8	45.6	-6	6	7	46.4	47.4	0-14	6	35.9	37.0	
7-18	4	48.0	46.5	3	6	7	47.2	47.1	-6	10	7	91.2	91.9	
-7	4	6	75.6	71.7	3-12	7	44.7	45.6	5	2	7	86.3	86.4	
2	10	6	72.1	68.7	-9	8	5	52.6	52.5	1-12	7	72.6	72.1	
5-14	6	76.8	73.8	4	10	5	46.2	45.8	-6	2	7	30.8	30.5	
-10	16	2	32.3	35.2	5-18	5	40.0	40.2	1	10	7	38.6	37.8	
8	4	2	18.3	19.2	-9	10	5	45.2	44.2	5-12	7	39.5	39.4	
2-20	2	24.1	26.2	5	8	5	46.4	46.6	-10	20	0	44.5	46.9	
-10	4	2	84.9	85.3	4-18	5	56.9	57.0	10	0	0	42.7	45.5	
2	16	2	85.7	86.2	-10	16	3	47.2	48.2	0-20	0	35.9	37.3	
8-20	2	78.6	80.8	8	4	3	43.7	44.9	-10	20	1	19.0	20.7	
-5	2	7	20.1	19.6	2-20	3	19.0	20.9	10	0	1	33.3	36.1	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0-20	1	20.2	23.0	1	14	6	22.9	22.2	-11	2	1	28.0	29.2	
-10	14	4	67.3	66.1	7-16	6	12.7	9.8	1	20	1	19.6	20.0	
7	6	4	57.6	55.6	-7	10	7	50.9	49.5	10-22	1	43.3	46.3	
3-20	4	47.2	46.5	5	4	7	51.4	51.2	-12	8	1	42.0	40.9	
-10	6	4	17.4	18.5	2-14	7	56.1	54.4	4	16	1	46.2	44.8	
3	14	4	19.2	20.5	-7	4	7	38.8	39.7	8-24	1	29.8	29.2	
7-20	4	30.7	33.7	2	10	7	45.0	47.5	-10	18	4	36.8	37.7	
-9	14	5	50.3	50.6	5-14	7	25.6	25.3	9	2	4	45.4	44.3	
7	4	5	44.8	44.4	-12	12	0	22.4	23.1	1-20	4	62.0	60.8	
2-18	5	48.2	48.6	6	12	0	27.2	26.4	-11	10	4	56.5	56.0	
-8	12	6	31.0	30.5	6-24	0	22.6	25.2	5	12	4	44.6	44.2	
6	4	6	27.0	26.2	-11	18	2	35.1	35.4	6-22	4	76.7	76.6	
2-16	6	29.7	29.1	9	4	2	35.6	34.4	-11	12	4	32.5	34.3	
-11	16	2	44.1	43.9	2-22	2	21.4	21.4	6	10	4	28.7	30.5	
8	6	2	55.4	54.5	-11	4	2	36.2	34.8	5-22	4	23.4	26.1	
3-22	2	60.1	60.1	2	18	2	33.2	31.4	-10	2	4	33.8	36.1	

-11	6	2	30.0	30.6	9-22	2	33.9	30.2	1	18	4	49.7	53.7	
3	16	2	55.0	57.3	-5	4	8	35.1	35.3	9-20	4	33.5	35.7	
8-22	2	40.0	42.6	2	6	8	36.7	38.3	-9	12	6	90.7	90.0	
-4	2	8	18.1	16.9	3-10	8	45.3	47.9	6	6	6	86.7	84.8	
1	6	8	21.9	19.4	-12	14	0	62.0	64.1	3-18	6	84.4	84.3	
3	-8	8	16.0	15.4	7	10	0	52.6	53.4	-9	6	6	106.9	104.7
-11	4	0	63.7	62.3	5-24	0	40.0	43.2	3	12	6	106.8	102.8	
2	18	0	47.5	46.1	-10	10	5	30.9	32.7	6-18	6	94.6	92.6	
9-22	0	79.0	81.9	5	10	5	47.6	50.0	-12	12	2	47.9	52.6	
-9	18	4	33.5	34.7	5-20	5	46.4	48.8	6	12	2	47.7	51.1	
9	0	4	40.8	40.7	-12	14	1	36.5	38.0	6-24	2	54.8	61.2	
0-18	4	41.2	41.5	7	10	1	41.7	43.5	-10	14	5	33.6	37.0	
-10	18	3	53.6	51.8	5-24	1	45.2	46.3	7	6	5	29.3	31.7	
9	2	3	58.3	55.3	-12	10	1	29.0	28.2	3-20	5	45.3	52.0	
1-20	3	60.4	57.7	5	14	1	24.0	23.5	-10	6	5	38.6	41.9	
-11	12	3	66.2	64.5	7-24	1	33.3	32.3	3	14	5	36.7	39.4	
6	10	3	61.0	59.6	-5	2	8	82.4	76.8	7-20	5	27.9	28.9	
5-22	3	73.5	70.8	1	8	8	71.5	66.8	-8	16	6	109.8	107.8	
-11	10	3	42.0	43.8	4-10	8	82.2	77.3	8	0	6	111.3	108.8	
5	12	3	41.2	42.7	-5	8	8	50.9	50.1	0-16	6	117.0	113.8	
6-22	3	43.1	45.6	4	2	8	40.4	38.8	-12	10	2	44.5	49.2	
-10	2	3	23.5	26.1	1-10	8	45.7	44.2	5	14	2	51.0	55.6	
1	18	3	20.7	22.1	-11	2	0	78.2	76.5	7-24	2	27.9	31.0	
9-20	3	32.0	35.2	1	20	0	96.8	94.9	-5	10	8	41.9	40.4	
-11	4	1	92.5	92.3	10-22	0	82.5	83.4	5	0	8	37.9	35.8	
2	18	1	96.3	96.3	-10	8	5	43.7	44.0	0-10	8	30.6	29.2	
9-22	1	77.2	77.2	4	12	5	41.2	40.9	-11	14	4	55.8	57.1	
-11	14	3	32.6	33.8	6-20	5	47.2	47.8	7	8	4	54.2	54.3	

7	8	3	40.6	42.3	-9	10	6	48.1	48.2	4-22	4	55.7	57.3	
4-22	3	36.2	37.5	5	8	6	37.2	37.6	-11	8	4	82.1	80.2	
-7	8	7	74.1	72.0	4-18	6	16.8	17.7	4	14	4	89.3	86.8	
4	6	7	74.1	72.3	-7	12	7	23.0	25.2	7-22	4	88.3	86.9	
3-14	7	76.0	73.9	6	2	7	23.2	25.6	-11	18	3	24.4	25.4	
-4	8	8	21.9	22.8	1-14	7	12.7	14.1	9	4	3	35.4	37.8	
4	0	8	22.0	22.9	-12	16	0	48.1	48.3	2-22	3	39.0	40.4	
0	-8	8	23.0	24.6	8	8	0	53.6	54.2	-11	4	3	86.1	85.4
-10	16	4	50.1	52.6	4-24	0	49.1	48.0	2	18	3	82.4	80.4	
8	4	4	51.8	51.9	-12	8	0	37.2	34.1	9-22	3	70.4	69.0	
2-20	4	48.9	50.0	4	16	0	32.9	29.9	-9	18	5	32.3	31.6	
-8	14	6	59.5	58.0	8-24	0	58.2	53.6	9	0	5	29.5	29.9	
7	2	6	65.0	62.0	-11	20	1	105.5	100.4	0-18	5	32.6	32.0	
1-16	6	62.0	59.9	10	2	1	103.9	98.8	-11	20	2	66.7	69.6	
-8	2	6	24.9	24.6	1-22	1	91.1	87.3	10	2	2	75.7	75.9	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
1-22	2	95.9	98.1	1	20	3	31.1	31.4	-13	10	0	44.8	47.7	
-6	6	8	30.9	28.9	10-22	3	60.3	59.6	5	16	0	44.6	46.1	
3	6	8	33.5	30.7	-12	20	0	38.9	43.3	8-26	0	46.4	48.8	
3-12	8	39.9	35.7	10	4	0	27.8	31.8	-10	14	6	27.8	22.8	
-12	18	0	72.3	73.4	2-24	0	45.0	51.7	7	6	6	28.1	25.0	
9	6	0	71.5	69.9	-12	4	0	50.4	49.9	3-20	6	26.9	23.1	
3-24	0	67.9	67.8	2	20	0	54.7	55.2	-12	6	3	36.2	36.5	
-12	6	0	25.3	25.0	10-24	0	56.6	58.3	3	18	3	21.1	21.4	
3	18	0	31.3	29.7	-12	20	1	30.5	30.4	9-24	3	34.1	34.0	
9-24	0	31.6	32.9	10	4	1	33.1	33.5	-9	10	7	37.9	38.1	
-12	16	2	83.9	83.1	2-24	1	38.3	37.9	5	8	7	36.5	35.4	
8	8	2	81.4	79.6	-11	4	4	70.1	67.0	4-18	7	34.0	33.1	
4-24	2	66.9	66.4	2	18	4	62.0	59.4	-9	8	7	29.9	32.3	

-12	8	2	84.1	83.5	9-22	4	80.0	77.1	4	10	7	22.7	23.7	
4	16	2	79.8	78.5	-10	10	6	31.5	31.1	5-18	7	22.1	23.1	
8-24	2	99.5	97.4	5	10	6	23.6	21.2	-9	18	6	34.6	33.5	
-6	8	8	70.1	67.5	5-20	6	40.6	42.0	9	0	6	37.1	35.8	
4	4	8	74.7	71.6	-6	12	8	22.9	21.9	0-18	6	37.5	36.6	
2-12	8	79.6	76.0	6	0	8	25.7	24.7	-9	12	7	55.4	54.3	
-6	4	8	68.3	66.7	0-12	8	40.8	36.4	6	6	7	66.6	64.9	
2	8	8	72.2	70.9	-10	18	5	30.9	32.3	3-18	7	69.8	68.7	
4-12	8	76.6	75.0	9	2	5	29.5	30.1	-9	6	7	27.8	29.4	
-12	6	1	43.9	40.5	1-20	5	27.2	27.7	3	12	7	33.8	34.2	
3	18	1	29.6	26.9	-11	12	5	48.4	48.1	6-18	7	31.1	31.5	
9-24	1	41.3	38.9	6	10	5	44.3	43.6	-11	16	5	34.6	31.4	
-10	16	5	26.0	26.5	5-22	5	46.5	45.8	8	6	5	22.1	22.1	
8	4	5	21.4	22.7	-11	10	5	71.1	70.8	3-22	5	33.5	31.4	
2-20	5	17.3	18.8	5	12	5	65.7	66.0	-13	12	2	50.3	50.4	
-10	4	5	34.5	33.2	6-22	5	52.0	51.6	6	14	2	42.3	41.0	
2	16	5	20.8	21.1	-10	12	6	31.0	30.6	7-26	2	55.4	57.0	
8-20	5	31.7	30.1	6	8	6	20.6	19.4	-5	6	9	48.6	49.3	
-3	4	9	78.2	78.6	4-20	6	30.8	30.7	3	4	9	53.0	53.8	
2	2	9	81.2	81.5	-4	2	9	23.9	22.6	2-10	9	52.2	54.2	
1	-6	9	81.3	81.8	1	6	9	32.3	31.9	-5	4	9	38.0	37.9
-3	2	9	52.7	52.2	3	-8	9	25.4	24.7	2	6	9	40.1	39.4
1	4	9	59.5	59.1	-7	8	8	33.4	35.4	3-10	9	42.2	42.4	
2	-6	9	51.0	50.2	4	6	8	26.9	28.5	-7	12	8	50.5	50.7
-6	10	8	84.5	81.2	3-14	8	13.6	15.3	6	2	8	45.2	43.0	
5	2	8	85.6	81.8	-13	12	0	57.5	52.8	1-14	8	52.8	52.4	
1-12	8	83.5	79.3	6	14	0	46.5	44.0	-7	2	8	72.5	71.0	
-6	2	8	24.3	21.7	7-26	0	32.1	29.5	1	12	8	72.9	72.0	

1	10	8	25.3	22.3	-13	14	0	48.2	49.2	6-14	8	68.0	67.1	
5-12	8	27.3	23.9	7	12	0	62.1	62.8	-13	18	0	73.1	71.1	
-10	20	4	38.9	43.1	6-26	0	45.9	47.1	9	8	0	58.6	59.8	
10	0	4	26.5	28.2	-11	14	5	30.3	32.8	4-26	0	43.2	43.0	
0-20	4	28.2	30.5	7	8	5	36.2	37.9	-11	2	4	73.5	71.5	
-12	6	2	39.8	44.7	4-22	5	27.3	28.5	1	20	4	83.0	80.4	
3	18	2	41.1	46.3	-13	14	1	50.4	47.5	10-22	4	76.4	76.5	
9-24	2	46.8	53.9	7	12	1	54.6	51.9	-12	16	4	38.5	37.8	
-9	16	6	51.6	51.3	6-26	1	64.6	61.1	8	8	4	38.7	38.6	
8	2	6	36.3	37.8	-13	12	1	36.3	38.1	4-24	4	41.6	42.0	
1-18	6	27.4	29.4	6	14	1	34.1	35.4	-12	8	4	38.2	36.1	
-9	2	6	43.3	43.6	7-26	1	17.1	17.0	4	16	4	37.6	36.0	
1	16	6	28.4	26.4	-7	10	8	31.8	30.8	8-24	4	44.6	40.8	
8-18	6	43.4	44.2	5	4	8	38.1	35.9	-10	4	6	59.0	57.0	
-11	20	3	118.3	112.5	2-14	8	21.7	20.6	2	16	6	64.4	62.3	
10	2	3	115.0	109.5	-13	16	0	68.3	72.5	8-20	6	61.4	62.1	
1-22	3	96.7	91.2	8	10	0	68.3	70.6	-9	14	7	37.2	38.8	
-11	2	3	33.9	33.3	5-26	0	66.5	69.9	7	4	7	35.6	37.0	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
2-18	7	41.1	42.9	7	10	5	39.5	40.4	-13	14	4	46.0	47.6	
-8	8	8	99.3	94.5	5-24	5	46.5	47.1	7	12	4	56.9	58.1	
4	8	8	94.9	90.4	-12	10	5	32.7	26.8	6-26	4	37.2	38.7	
4-16	8	102.0	98.1	5	14	5	24.7	21.0	-9	18	7	30.7	29.9	
-11	4	5	75.0	76.6	7-24	5	30.0	24.7	9	0	7	29.9	27.9	
2	18	5	81.4	84.3	-6	10	9	73.9	72.7	0-18	7	36.6	36.2	
9-22	5	60.3	62.1	5	2	9	73.3	73.3	-7	8	9	49.4	48.8	
-13	18	2	77.3	76.7	1-12	9	71.9	71.5	4	6	9	53.4	52.7	
9	8	2	64.8	62.4	-10	8	7	38.7	37.6	3-14	9	51.3	50.1	
4-26	2	67.4	66.6	4	12	7	41.0	40.5	-14	18	0	41.3	46.6	

-12	22	2	50.7	51.2	6-20	7	44.4	44.1	9	10	0	40.0	43.2	
11	2	2	36.0	35.7	-12	24	1	33.7	33.7	5-28	0	30.5	32.4	
1-24	2	38.1	38.3	12	0	1	30.3	30.1	-14	10	0	31.8	34.1	
-13	8	2	46.1	46.9	0-24	1	29.1	28.9	5	18	0	23.7	24.3	
4	18	2	27.6	27.6	-11	20	5	83.0	82.5	9-28	0	57.2	63.8	
9-26	2	33.9	34.6	10	2	5	78.6	76.8	-13	16	4	68.1	68.3	
-12	2	2	31.1	28.6	1-22	5	65.3	64.7	8	10	4	60.2	58.0	
1	22	2	33.6	31.6	-11	2	5	21.2	23.2	5-26	4	70.4	70.3	
11-24	2	41.3	39.4	1	20	5	20.1	21.7	-13	10	4	44.9	47.6	
-8	6	8	26.1	26.2	10-22	5	32.6	35.9	5	16	4	39.6	40.3	
3	10	8	31.4	32.8	-12	20	4	33.1	33.1	8-26	4	45.3	50.1	
5-16	8	33.5	33.4	10	4	4	25.8	24.9	-13	6	3	54.5	54.6	
-12	18	4	45.1	46.5	2-24	4	32.2	32.3	3	20	3	49.0	48.9	
9	6	4	47.3	47.1	-12	4	4	46.4	43.8	10-26	3	49.5	52.0	
3-24	4	50.7	52.2	2	20	4	49.8	47.5	-12	6	5	37.8	36.6	
-13	14	3	40.1	40.4	10-24	4	42.7	42.2	3	18	5	27.7	25.8	
7	12	3	39.0	38.6	-8	2	8	94.2	88.7	9-24	5	27.4	26.3	
6-26	3	50.6	50.9	1	14	8	88.5	83.9	-14	10	1	64.2	62.1	
-13	12	3	30.3	27.3	7-16	8	96.4	93.6	5	18	1	73.1	70.7	
6	14	3	32.9	30.9	-12	8	5	37.1	35.9	9-28	1	63.2	61.4	
7-26	3	31.8	29.9	4	16	5	42.6	41.0	-4	4	10	70.8	68.9	
-13	6	1	50.6	53.3	8-24	5	33.4	33.5	2	4	10	71.3	68.7	
3	20	1	55.8	59.5	-11	16	6	28.7	30.6	2	-8	10	79.8	77.2
10-26	1	39.7	40.7	8	6	6	31.2	31.4	-14	14	2	64.5	65.5	
-6	6	9	28.9	27.3	3-22	6	36.9	38.8	7	14	2	58.2	57.1	
3	6	9	26.9	26.8	-11	6	6	45.1	44.8	7-28	2	53.6	56.4	
3-12	9	29.1	29.0	3	16	6	60.6	58.7	-13	4	2	40.7	40.7	
-1	2	10	25.8	21.2	8-22	6	54.7	54.6	2	22	2	49.7	49.5	

1	0	10	23.6	19.5	-10	14	7	53.9	50.7	11-26	2	48.6	52.5	
0	-2	10	25.3	22.0	7	6	7	46.7	44.2	-7	4	9	31.2	33.5
-6	4	9	51.6	50.7	3-20	7	61.8	58.2	2	10	9	36.3	37.8	
2	8	9	63.6	64.2	-10	6	7	27.3	25.8	5-14	9	26.4	27.5	
4-12	9	45.0	45.0	3	14	7	25.4	25.1	-7	10	9	38.2	41.6	
-8	4	8	54.6	54.1	7-20	7	27.7	28.0	5	4	9	31.4	32.9	
2	12	8	50.4	50.4	-14	16	0	51.5	53.2	2-14	9	41.6	45.2	
6-16	8	62.0	62.5	8	12	0	57.5	59.4	-10	4	7	24.7	22.5	
-2	2	10	80.2	78.7	6-28	0	80.3	81.2	2	16	7	14.2	12.2	
1	2	10	77.6	75.9	-13	22	1	36.6	35.7	8-20	7	34.9	31.1	
1	-4	10	80.8	79.4	11	4	1	35.8	35.1	-4	2	10	40.7	38.4
-11	14	6	22.5	23.4	2-26	1	27.5	26.0	1	6	10	39.4	37.5	
7	8	6	30.5	31.0	-14	14	1	46.5	48.3	3	-8	10	37.2	35.3
4-22	6	23.5	24.2	7	14	1	26.9	28.9	-8	16	8	54.6	54.4	
-10	10	7	29.7	30.1	7-28	1	39.1	41.3	8	0	8	45.4	44.3	
5	10	7	37.1	39.5	-13	4	1	33.7	33.1	0-16	8	49.7	49.4	
5-20	7	31.3	31.5	2	22	1	35.9	36.1	-13	18	4	43.5	46.1	
-12	24	0	83.7	85.4	11-26	1	50.0	50.4	9	8	4	31.1	33.5	
12	0	0	85.6	86.4	-14	16	1	26.5	26.6	4-26	4	18.8	18.9	
0-24	0	92.4	92.8	8	12	1	23.8	23.4	-4	8	10	47.2	48.3	
-12	14	5	33.5	34.1	6-28	1	27.3	27.0	4	0	10	50.9	52.9	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
0	-8	10	44.6	45.8	4	16	6	45.8	43.3	-14	18	4	40.1	41.7
-9	14	8	48.9	48.0	8-24	6	77.1	77.3	9	10	4	39.8	41.2	
7	4	8	54.4	52.9	-13	2	2	91.0	88.9	5-28	4	32.1	33.8	
2-18	8	50.7	49.5	1	24	2	79.8	78.4	-14	10	4	25.2	27.1	
-9	4	8	29.8	27.5	12-26	2	65.8	64.7	5	18	4	22.9	23.7	
2	14	8	39.9	38.1	-14	10	3	52.3	50.7	9-28	4	42.6	47.7	
7-18	8	33.7	31.1	5	18	3	64.7	63.2	-13	6	5	43.0	43.3	

-13	2	0	51.3	53.2	9-28	3	63.5	64.6	3	20	5	48.2	48.6	
1	24	0	29.9	30.0	-5	10	10	46.5	44.1	10-26	5	37.5	35.9	
12-26	0	49.1	51.4	5	0	10	52.0	50.4	-15	16	2	73.9	72.3	
-12	12	6	49.1	50.3	0-10	10	50.5	49.6	8	14	2	86.8	82.7	
6	12	6	45.2	43.7	-10	8	8	33.8	37.0	7-30	2	62.0	60.2	
6-24	6	49.9	50.8	4	12	8	37.3	41.0	-15	20	0	40.0	42.0	
-5	6	10	28.2	25.4	6-20	8	23.0	24.4	10	10	0	22.8	20.4	
3	4	10	28.3	25.5	-10	12	8	27.1	26.5	5-30	0	38.6	41.3	
2-10	10	33.5	30.5	6	8	8	27.1	25.1	-15	10	0	38.0	40.5	
-14	14	3	34.6	35.6	4-20	8	32.0	30.0	5	20	0	35.2	39.2	
7	14	3	25.7	25.8	-12	24	4	58.6	59.7	10-30	0	34.1	35.5	
7-28	3	33.5	33.1	12	0	4	61.7	60.7	-6	12	10	45.6	44.0	
-13	22	3	52.8	54.4	0-24	4	66.5	65.9	6	0	10	50.8	49.3	
11	4	3	47.9	48.9	-6	6	10	50.3	48.5	0-12	10	46.7	45.6	
2-26	3	34.1	34.5	3	6	10	52.9	50.5	-15	18	2	33.1	34.8	
-13	4	3	32.8	35.5	3-12	10	40.0	38.6	9	12	2	26.3	25.9	
2	22	3	37.7	40.2	-12	6	6	38.9	40.7	6-30	2	40.0	41.0	
11-26	3	50.0	51.9	3	18	6	33.9	34.4	-15	12	2	29.1	33.3	
-10	18	7	36.6	35.8	9-24	6	36.6	38.4	6	18	2	28.1	31.3	
9	2	7	43.2	42.4	-6	4	10	21.8	23.2	9-30	2	37.6	44.1	
1-20	7	37.4	37.5	2	8	10	18.4	18.3	-3	2	11	41.2	43.5	
-11	12	7	44.0	43.0	4-12	10	29.0	29.9	1	4	11	39.1	39.5	
6	10	7	45.9	44.6	-14	20	3	35.4	36.8	2	-6	11	41.2	43.9
5-22	7	48.2	47.2	10	8	3	52.0	53.1	-3	4	11	47.3	48.7	
-11	10	7	43.3	46.7	4-28	3	40.3	41.6	2	2	11	46.8	46.8	
5	12	7	39.7	41.5	-10	6	8	21.4	22.8	1	-6	11	47.1	47.6
6-22	7	38.6	41.6	3	14	8	25.5	26.2	-7	6	10	32.8	30.8	
-13	20	4	47.4	47.3	7-20	8	31.6	32.3	3	8	10	30.4	28.3	

10	6	4	37.5	35.1	-15	16	0	26.6	26.4	4-14	10	34.4	31.4	
3-26	4	40.4	39.3	8	14	0	39.8	39.0	-13	12	6	55.2	53.7	
-5	8	10	29.8	27.9	7-30	0	44.7	44.5	6	14	6	45.3	43.6	
4	2	10	28.0	25.8	-13	22	4	31.6	30.6	7-26	6	53.3	51.5	
1-10	10	29.3	27.8	11	4	4	27.7	24.5	13	-2	4	54.0	53.4	
-11	20	6	72.6	72.2	2-26	4	38.7	34.6	-1-24	4	31.4	29.9		
10	2	6	72.3	69.1	-14	16	4	44.2	47.1	-12	26	4	39.5 37.3	
1-22	6	87.3	85.0	8	12	4	40.0	41.0	-7	10	10	33.0	31.4	
-14	20	2	52.7	53.6	6-28	4	60.4	64.7	5	4	10	25.9	24.2	
10	8	2	56.4	57.0	-14	12	4	31.6	34.1	2-14	10	41.1	37.5	
4-28	2	72.6	76.2	6	16	4	32.3	35.2	-7	4	10	51.7	53.7	
-14	8	2	44.1	43.1	8-28	4	31.0	34.6	2	10	10	47.5	49.0	
4	20	2	46.3	45.1	-15	18	0	28.5	31.0	5-14	10	52.9	55.3	
10-28	2	35.4	37.8	9	12	0	27.4	27.3	-11	20	7	75.1	71.8	
-11	14	7	24.5	25.2	6-30	0	19.0	21.7	10	2	7	72.7	71.5	
7	8	7	35.2	38.3	-6	2	10	14.8	10.9	1-22	7	62.5	60.7	
4-22	7	27.3	29.3	1	10	10	19.7	15.4	-10	18	8	24.8	26.5	
-13	14	5	40.0	38.6	5-12	10	22.8	17.5	9	2	8	30.0	31.9	
7	12	5	43.1	41.6	-11	4	7	58.6	61.6	1-20	8	43.1	47.2	
6-26	5	52.1	50.2	2	18	7	62.6	65.6	-11	10	8	39.5	40.7	
-12	16	6	65.6	67.9	9-22	7	46.0	47.6	5	12	8	31.1	31.0	
8	8	6	65.4	67.5	-15	12	1	49.1	49.3	6-22	8	45.9	46.0	
4-24	6	53.6	54.4	6	18	1	45.3	44.7	-14	14	5	40.7	41.6	
-12	8	6	52.4	50.8	9-30	1	49.9	50.4	7	14	5	24.3	26.9	
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
7-28	5	37.0	39.3	9	14	0	45.5	46.8	-15	12	5	48.4	47.1	
-13	4	5	27.0	30.2	7-32	0	32.4	28.7	6	18	5	46.8	44.5	
2	22	5	26.8	30.6	-14	4	4	26.4	26.5	9-30	5	43.0	41.3	
11-26	5	41.0	47.8	2	24	4	29.4	30.0	-2	4	12	20.7	18.1	

-11	14	8	41.2	40.5	12-28	4	34.4	34.7	2	0	12	20.4	17.6	
7	8	8	42.0	41.0	-14	26	3	45.7	43.1	0	-4	12	27.0	23.0
4-22	8		39.1	38.1	13	2	3	50.6	50.4	-14	20	6	50.0	54.5
-11	8	8	55.5	50.7	1-28	3		52.6	51.4	10	8	6	49.2	51.0
4	14	8	64.6	60.7	14	-2	3	27.6	23.7	4-28	6		51.7	54.0
7-22	8		69.4	65.9	-1-26	3		37.5	33.4	-7	8	11	33.9	32.8
-13	18	6	75.1	69.9	-13	28	3	42.4	33.6	4	6	11	28.8	26.5
9	8	6	65.2	61.3	-13	14	7	34.6	33.4	3-14	11		35.7	35.6
4-26	6		68.7	65.5	7	12	7	36.7	36.4	-13	2	6	53.9	56.1
-12	22	6	38.5	35.6	6-26	7		51.7	51.9	1	24	6	47.5	50.9
11	2	6	29.4	27.9	-6	6	11	37.8	38.4	12-26	6		49.4	55.3
1-24	6		27.2	25.2	3	6	11	33.2	32.7	-13	6	7	34.1	37.0
-14	26	1	40.1	40.6	3-12	11		35.3	36.3	3	20	7	34.7	38.1
13	2	1	38.6	37.4	-8	14	10	35.4	34.7	10-26	7		29.9	32.5
1-28	1		44.9	46.1	7	2	10	35.8	34.6	-16	24	0	41.9	40.0
-14	24	3	37.7	37.0	1-16	10		30.6	28.8	12	8	0	33.4	34.0
12	4	3	34.7	34.3	-14	14	6	44.3	46.3	4-32	0		32.3	29.7
2-28	3		34.9	35.8	7	14	6	46.3	47.6	-16	8	0	56.3	53.3
-14	10	5	59.0	55.2	7-28	6		33.5	34.4	4	24	0	52.8	51.1
5	18	5	68.5	64.4	-13	4	6	43.0	42.3	12-32	0		67.1	63.5
9-28	5		53.4	49.3	2	22	6	58.9	57.5	-7	10	11	30.6	29.7
-15	22	2	53.4	53.0	11-26	6		50.5	51.1	5	4	11	25.5	25.9
11	8	2	49.3	47.9	-6	4	11	22.4	24.7	2-14	11		29.8	27.9
4-30	2		41.2	41.1	2	8	11	22.4	22.2	-3	4	12	38.4	34.9
-14	26	2	31.4	38.0	4-12	11		17.1	17.6	2	2	12	32.9	30.1
13	2	2	31.9	35.3	-16	18	2	57.6	57.0	1	-6	12	36.6	34.6
1-28	2		52.4	59.7	9	14	2	58.1	56.2	-3	2	12	25.9	22.4
-15	24	0	44.0	47.6	7-32	2		65.7	67.2	1	4	12	22.2	19.8

12	6	0	50.9	52.3	-15	4	0	38.2	38.6	2	-6	12	26.0	23.1
3-30	0	53.9	55.6	2	26	0	34.8	35.5	-3	6	12	59.7	52.7	
-5	4	11	37.9	36.7	13-30	0	31.1	32.5	3	0	12	61.6	55.5	
2	6	11	37.8	37.2	-11	2	8	47.3	43.7	0	-6	12	61.5	54.7
3-10	11	44.3	44.4	1	20	8	55.7	51.7	-15	24	4	32.0	35.7	
-5	6	11	36.7	38.5	10-22	8	52.3	50.9	12	6	4	34.4	35.6	
3	4	11	36.8	38.4	-16	22	0	37.1	35.4	3-30	4	42.6	46.3	
2-10	11	32.9	33.2	11	10	0	29.9	24.7	-16	24	2	53.7	57.9	
-8	10	10	34.4	35.5	5-32	0	36.9	33.2	12	8	2	47.4	50.4	
5	6	10	44.8	45.9	-16	10	0	51.7	48.8	4-32	2	64.0	69.8	
3-16	10	39.8	41.6	5	22	0	54.4	51.3	-16	8	2	72.9	73.1	
-8	6	10	43.8	45.3	11-32	0	56.9	58.2	4	24	2	69.9	69.5	
3	10	10	45.7	47.8	-6	2	11	21.8	20.9	12-32	2	71.9	73.0	
5-16	10	44.9	46.7	1	10	11	30.3	28.9	-16	16	4	49.0	52.0	
-7	14	10	24.0	24.2	5-12	11	32.8	34.0	8	16	4	48.2	49.0	
7	0	10	25.5	24.2	-6	10	11	52.2	52.8	8-32	4	50.7	55.0	
0-14	10	22.6	20.6	5	2	11	47.5	47.3	-8	8	11	29.3	24.3	
-16	16	0	43.5	48.4	1-12	11	46.4	46.1	4	8	11	19.6	17.6	
8	16	0	50.1	55.1	-9	12	10	48.8	52.6	4-16	11	22.8	19.9	
8-32	0	47.1	53.0	6	6	10	49.5	51.6	13-16	8	44.7	44.0		
-10	14	9	39.0	39.8	3-18	10	44.3	47.3	-8-10	8	41.9	40.9		
7	6	9	34.0	33.6	-9	6	10	60.4	60.6	-5	26	8	51.6	52.9
3-20	9	41.1	40.7	3	12	10	67.6	67.3	-13	10	8	33.7	36.3	
-11	4	8	52.5	52.0	6-18	10	55.2	55.2	5	16	8	31.6	32.5	
2	18	8	42.9	43.1	-8	16	10	68.7	64.7	8-26	8	29.9	33.3	
9-22	8	55.7	54.3	8	0	10	71.8	68.6	15-16	6	41.8	42.8		
-16	18	0	40.0	40.4	0-16	10	78.4	75.0	-8-14	6	50.2	50.5		
H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
-7	30	6	43.0	44.8	10	2	9	60.0	59.9	-6	10	12	33.8	33.6

-14	10	7	41.3	42.8	1-22	9	46.5	46.2	5	2	12	36.8	37.7
5	18	7	46.2	47.1	-6	4	12	43.8	42.9	1-12	12	37.3	38.2
9-28	7	37.9	38.1	2	8	12	41.3	39.5	-12	24	8	36.1	40.8
-17	14	1	46.6	51.8	4-12	12	46.1	44.4	12	0	8	36.8	38.8
7	20	1	41.0	44.2	-6	8	12	23.5	24.0	0-24	8	40.7	43.1
10-34	1	40.6	43.6	4	4	12	24.9	24.3	-7	10	12	31.2	25.1
-5	4	12	25.7	25.3	2-12	12	29.9	30.7	5	4	12	35.6	27.4
2	6	12	26.8	26.9	-16	8	4	44.2	47.7	2-14	12	28.3	24.9
3-10	12	24.8	24.0	4	24	4	38.2	40.5	-3	4	13	37.3	39.6
-5	8	12	25.8	26.0	12-32	4	48.9	51.5	2	2	13	37.5	39.5
4	2	12	23.5	23.0	-9	10	11	21.1	16.7	1	-6	13	38.2
40.3	1-10	12	27.0	26.1	5	8	11	22.1	17.7	-3	2	13	24.0
30.4	-5	2	12	39.3	36.2	4-18	11	27.5	24.7	1	4	13	25.4
32.4	1	8	12	41.6	39.7	-17	14	3	39.4	42.8	2	-6	13
19.9	4-10	12	46.6	45.3	7	20	3	41.0	45.1	-7	12	12	28.1
26.0	-16	10	4	46.9	52.7	10-34	3	44.1	47.4	6	2	12	34.4
33.8	5	22	4	47.2	51.9	-9	6	11	30.8	26.8	1-14	12	33.8
32.5	11-32	4	42.0	49.1	3	12	11	36.8	32.3	-7	2	12	27.3
30.7	-10	4	10	41.2	44.5	6-18	11	37.2	32.8	1	12	12	26.4
29.1	2	16	10	38.2	39.9	-9	12	11	33.2	34.3	6-14	12	27.0
32.3	8-20	10	36.4	38.4	6	6	11	39.4	42.3	0	0	0	0.0
0.0	-11	20	9	64.3	66.7	3-18	11	39.5	42.6	0	0	0	0.0
0.0													

[/noprocess]