

Table 3. Analytical data for two large hopper crystals of corundum

1174C								
	corundum							
	in contact with Cr balls					cores		main
	SEM		EMP	TEM		SEM	EMP	
wt. %	n=9	stdev	n=3	low-Cr	high-Cr	n=3	n=3	n=6
SiO ₂			0.01				0.00	0.01
ZrO ₂			0.00				0.00	0.00
Ti ₂ O ₃			0.00				0.00	0.01
Al ₂ O ₃	68.6	9.0	68.90	70.4	42.2	97.0	97.08	76.80
Cr ₂ O ₃	31.4	3.3	31.15	29.7	57.6	2.95	2.95	23.14
V ₂ O ₃			0.02				0.00	0.02
FeO			0.00				0.00	0.00
MnO			0.04				0.02	0.05
MgO			0.01				0.00	0.01
CaO			0.00				0.00	0.02
total	100.0		100.14	100.1	99.8	100.0	100.1	100.0
at. %								
Al	30.6		30.6	31.2	20.8	39.2	39.2	33.3
Cr	9.41		9.29	8.84	19.1	0.80	0.80	6.72
V			0.01					0.01
Mn			0.01					0.02
Mg			0.01					0.01
Ca								
O	60.0		60.0	59.9	60.1	60.0	60.0	60.0
Cr#	0.24		0.23	0.22	0.48	0.02	0.02	0.17
ppm	(LA-ICPMS)							
Mg			98					17
Si			1405					1460
P			42					29
Sc			<0.9					<0.4
Ti			58					3
V			156					34
Cr			166000					13800
Fe			<28					<20
Co			<0.12					<0.03
Ni			<0.63					<0.12
Zn			<0.93					<0.75
Ga			0.22					<0.05
Zr			3.4					0.11
Nb			0.07					0.11

1174c (cont.)							
wt. %	β-alumina	spinel	% element	Cr balls		Cr nitride	
				SEM	EMP	SEM	TEM
	n=4	n=4		n=8	n=3	n=2	
			N			7.69	13.2
SiO ₂	0.02	0.01	Si	0.13	0.07	0.11	
ZrO ₂	0.00	0.01	Al		0.24		
Ti ₂ O ₃	0.00	0.01	Cr	99.9	99.31	92.1	86.8
Al ₂ O ₃	85.62	21.51	Mn		0.27		
Cr ₂ O ₃	4.74	58.46					
V ₂ O ₃	0.01	0.04	total	100.1	99.6	99.9	100.0
FeO	0.00	0.00					
MnO	0.02	0.14	at. %				
MgO	0.39	18.06	N			18.9	36.1

CaO	0.01	0.18	Si	0.10	0.13		
Na ₂ O	0.07	0.12	Al		0.46		
K ₂ O	9.43	0.00	Cr	99.9	99.15	81.1	63.9
total	100.30	98.53	Mn		0.27		
at. %							
Al	34.40	10.30					
Cr	1.28	18.70					
V							
Mn	0.01	0.10					
Mg	0.02	10.90					
Ca	0.03						
Na	0.10						
K	4.10						
O	60.10	60.00					
Cr#	0.04	0.65					

1175A						
	β-alumina	corundum				
		"core"		spinel	Cr-spin	CrN?
wt%	n=4	n=3	"rim"		SEM	SEM
		n=4		n=5	n=1	n=3
SiO ₂	0.02	0.03	0.01	0.02		N=17
ZrO ₂	0.00	0.02	0.00	0.02		
Ti ₂ O ₃	0.01	0.00	0.00	0.03		
Al ₂ O ₃	74.89	99.18	92.80	48.95	3.44	
Cr ₂ O ₃	9.83	0.73	8.23	26.51	76.4	Cr=83
V ₂ O ₃	0.00	0.01	0.00	0.03		
FeO	0.02	0.00	0.01	0.00		
MnO	0.05	0.00	0.01	0.12		
MgO	7.12	0.02	0.01	21.16	20.1	
CaO	0.16	0.01	0.01	0.05		
Na ₂ O	0.40	0.01	0.02	0.02		
K ₂ O	8.41	0.00	0.00	0.08		
total	100.91	100.00	101.09	97.0	99.9	
at.%						
Si	0.01			0.01		
Al	32.11	39.80	37.75	20.91	1.71	
Cr	2.82	0.19	2.25	7.60	25.6	56.8
Mg	3.78			11.43	12.7	
Na	0.35					
K	3.90					
O	56.97	60.0	60.0	60.1	60.1	
N						43.2
Cr#	0.081	0.005	0.06	0.27	0.94	