Supplementary Materials

Table S1. Description of the ruby-bearing samples used in this study.

Number of Sample	Mineral Association and Mode (wt.%)
C-10, C-7, C-5	Ruby (5–20), scapolite (15 – 30), muscovite (20 – 40), margarite (30 – 40)
C-11, C-4, C-33	Ruby (10 – 30), scapolite (20 – 30), phlogopite (50 – 60)
C-23, C-16	Ruby (20 – 30), plagioclase (20 – 30), muscovite (50)
C-2, C-9, C-15	Ruby (30 – 40), plagioclase (30 – 35), margarite (25 – 40)
C-41, C-17	Ruby (15 – 25), muscovite (15 – 20), phlogopite (25 – 35), margarite (25 – 35)
C-20. C-21	Ruby (50), calcite (50)

Table S2. Chemistry of muscovite (no. 1-4) chromium-bearing muscovite (no. 5–20) and fuchsite (no. 21–23).

Number	Number of Sample	Component (wt.%)											
		SiO_2	TiO_2	Al_2O_3	FeO_t	MgO	CaO	Na_2O	K_2O	F	Cr_2O_3	V_2O_3	Total
1	C-10/19	47.40	0.13	39.72	0.74	0.15	0.02	0.45	9.52	-	0.04	0.03	98.20
2	C-23/2	45.48	0.36	38.45	0.60	0.32	0.01	0.31	10.08	0.26	0.06	0.03	95.96
3	C-23/9	46.52	0.56	35.43	0.30	3.20	0.06	0.49	10.08	0.95	0.06	0.12	97.77
4	C-41/5	44.70	0.13	35.08	0.20	1.44	0.02	0.53	9.83	0.55	0.06	-	92.54
5	C-10/5	45.69	0.66	39.92	0.15	0.37	-	0.87	9.79	0.14	0.10	-	97.69
6	C-10/6	45.94	0.93	38.18	0.49	0.65	0.03	0.74	10.46	0.24	0.18	0.16	98.00
7	C-10/10	46.73	0.99	36.15	0.76	0.42	0.05	0.50	9.85	0.11	0.20	0.21	95.97
8	C-10	46.19	1.08	38.18	0.23	0.84	0.12	1.46	9.38	0.45	0.20	0.19	98.32
9	C-10/30	45.72	0.97	37.86	0.22	0.75	0.08	0.64	10.42	0.03	0.21	0.01	96.91
10	C-10/25	43.28	4.78	35.46	0.74	0.63	0.24	0.50	9.88	0.26	0.22	0.32	96.31
11	C-10/19	46.00	0.99	35.89	0.67	0.43	0.03	0.50	10.25	0.31	0.24	0.14	95.45
12	C-23/32	46.71	1.11	37.24	0.69	0.50	0.06	0.44	10.06	-	0.27	0.19	97.27
13	C-23/28	48.14	1.20	36.95	0.67	1.50	0.12	0.20	9.17	0.30	0.27	0.21	98.73
14	C-23/24	45.40	0.19	35.45	0.43	3.21	-	0.22	10.24	0.43	0.27	0.38	96.22
15	C-23/12	45.92	1.37	37.31	0.26	1.07	0.08	1.04	9.57	0.56	0.29	0.22	97.69
16	C-23/15	46.18	0.47	34.40	0.45	5.52	0.03	0.21	10.13	0.72	0.31	0.36	98.78
17	C-41	45.19	1.11	37.87	0.67	0.35	-	0.35	9.72	-	0.33	0.46	96.05
18	C-41/11	46.10	1.00	37.96	0.51	0.73	0.02	0.78	10.14	0.24	0.35	0.24	98.07
19	C-41/22	46.89	0.46	37.43	-	0.73	-	2.07	9.57	-	0.43	-	97.58
20	C-41/17	41.30	0.30	37.48	1.92	1.60	1.72	1.12	7.45	0.61	0.86	0.09	94.45
21	C-10/1	44.78	0.22	35.29	1.46	0.91	0.04	1.03	8.89	-	1.06	0.89	94.57
22	C-41/2	45.99	0.55	34.52	-	0.95	-	1.29	11.70	-	2.29	-	97.29
23	C-41/24	45.10	-	34.81	2.13	-	-	0.50	10.09	-	2.50	-	95.13

Some of oxides were additionally detected in analyses (wt.%): CoO – 0.01 in C-23/2; NiO – up to 0.06 in C-10/5 and C -41/11; MnO – 0.04 in C-10/10; NiO – 0.04 in C-10/25; NiO – up to 0.02 in C-23/32 and C-23/28; CoO – 0.03 in C-23/32; NiO – 0.07 in C-41.

Table 2. *cont.*

Recalculated on 7 cations (in apfu)												
Number	**Number of sample**	**Si apfu**	**Ti**	**Al**	**Fe**	**Mg**	**Ca**	**Na**	**K**	**F**	**Cr**	V
1	C-10/19	3.06	0.01	3.03	0.04	0.01	0.001	0.06	0.79	-	0.002	0.02
2	C-23/2	3.02	0.02	3.00	0.03	0.03	0.001	0.04	0.85	0.06	0.003	0.002
3	C-23/9	3.02	0.03	2.71	0.02	0.31	0.004	0.06	0.84	0.20	0.003	0.006
4	C-41/5	3.06	0.01	2.83	0.01	0.15	-	0.07	0.86	0.12	0.003	-
5	C-10/5	2.96	0.03	3.04	0.01	0.04	-	0.11	0.81	0.03	0.005	-
6	C-10/6	2.97	0.05	2.91	0.03	0.06	-	0.09	0.86	0.05	0.009	0.008
7	C-10/10	3.11	0.05	2.83	0.04	0.04	-	0.06	0.84	0.02	0.011	0.011
8	C-10	2.98	0.05	2.90	0.01	0.08	0.01	0.18	0.77	0.09	0.010	0.010
9	C-10/30	2.99	0.05	2.91	0.01	0.07	0.01	0.08	0.87	0.01	0.011	0.001
10	C-10/25	2.90	0.24	2.80	0.04	0.06	0.02	0.06	0.84	0.06	0.012	0.017
11	C-10/19	3.08	0.05	2.83	0.04	0.04	-	0.06	0.87	0.07	0.013	0.008
12	C-23/32	3.06	0.05	2.87	0.04	0.05	-	0.06	0.84	-	0.014	0.010
13	C-23/28	3.12	0.06	2.82	0.04	0.14	0.01	0.03	0.76	0.06	0.014	0.011
14	C-23/24	2.98	0.01	2.75	0.02	0.31	-	0.03	0.86	0.09	0.014	0.020
15	C-23/12	2.99	0.07	2.86	0.01	0.10	0.01	0.13	0.80	0.12	0.015	0.011
16	C-23/15	2.95	0.02	2.59	0.02	0.53	-	0.03	0.83	0.15	0.016	0.018
17	C-41	3.00	0.06	2.96	0.04	0.03	-	0.05	0.82	-	0.017	0.024
18	C-41/11	2.99	0.05	2.90	0.03	0.07	-	0.10	0.84	0.05	0.018	0.012
19	C-41/22	3.01	0.02	2.83	-	0.07	-	0.26	0.78	-	0.022	-
20	C-41/17	2.78	0.02	2.97	0.11	0.16	0.12	0.15	0.64	0.13	0.046	0.005
21	C-10/1	3.01	0.01	2.80	0.08	0.09	-	0.13	0.76	-	0.056	0.048
22	C-41/2	2.99	0.03	2.64	-	0.09	-	0.16	0.97	-	0.118	-
23	C-41/24	3.04	-	2.77	0.12	-	-	0.07	0.87	-	0.133	-

Table S3. Chemistry of margarite.

Component (wt.%)	Number of Samples										
	C-41/31	**C-2**	**C-2/4**	**C-2/17**	**C-41/36**	**C-2/13**	**C-2/28**	**C-2/41**	**C-2/30**	**C-41/41**	**C-41/40**
SiO_2	33.88	34.02	33.49	32.59	32.54	33.13	38.79	38.17	37.86	37.80	33.06
TiO_2	0.05	0.03	0.05	0.05	0.10	0.04	0.02	0.07	0.07	-	-
Al_2O_3	50.59	49.35	50.49	47.04	51.06	49.59	45.41	46.62	48.30	51.14	51.28
FeO_t	0.09	0.09	0.21	0.12	0.15	0.13	0.49	0.51	0.60	-	-
MgO	0.25	0.20	0.25	0.46	0.19	0.26	0.30	0.32	0.09	-	-
CaO	11.09	10.61	10.88	9.55	11.49	10.68	4.74	5.50	7.77	5.38	9.54
Na_2O	1.43	1.45	1.29	2.58	1.24	1.52	4.37	3.40	3.08	3.06	2.30
K_2O	0.31	0.66	0.48	0.39	0.46	0.41	1.04	0.73	0.36	0.58	0.33
Cr_2O_3	0.09	0.24	0.04	1.15	0.37	0.40	1.27	0.30	0.13	-	-
V_2O_3	0.03	0.02	0.02	0.03	0.10	0.03	0.02	0.10	0.07	-	-
Cl	0.01	-	0.04	0.04	0.03	0.02	0.01	0.01	-	-	-
F	0.18	0.03	0.32	0.09	0.17	0.19	0.17	0.20	0.19	-	-
Total	98.00	96.70	97.56	94.09	97.90	96.40	96.63	95.93	98.52	97.96	96.51
Recalculated on 7 cations (in apfu)											
Si	2.17	2.21	2.16	2.17	2.09	2.16	2.50	2.48	2.40	2.39	2.12
Ti	-	-	-	-	-	-	-	-	-	-	-
Al	3.83	3.78	3.84	3.70	3.87	3.82	3.45	3.57	3.60	3.80	3.88
Fe	-	-	0.01	0.01	0.01	0.01	0.03	0.03	0.03	-	-
Mg	0.02	0.02	0.02	0.05	0.02	0.03	0.03	0.03	0.01	0.00	0.00
Ca	0.76	0.74	0.75	0.68	0.79	0.75	0.33	0.38	0.53	0.36	0.66
Na	0.18	0.18	0.16	0.33	0.15	0.19	0.55	0.43	0.38	0.37	0.29
K	0.03	0.05	0.04	0.03	0.04	0.03	0.09	0.06	0.03	0.05	0.03
Cr	0.003	0.005	0.009	0.011	0.010	0.011	0.011	0.012	0.014	0.013	0.014
Cl	-	-	-	-	-	-		-	-	-	-
F	0.04	0.01	0.07	0.02	0.03	0.04	0.03	0.04	0.04	-	-

Table S4. Chemistry of phlogopite.

Number of Sample	Component (wt.%)												
	SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	F	Cr_2O_3	V_2O_3	Total
Df1	42.99	1.41	16.08	0.48	-	24.26	-	-	11.58	-	-	-	96.80
C-11/3	38.76	1.16	18.55	5.75	-	20.49	-	0.95	10.42	-	-	-	96.08
C-41/3	39.01	1.42	21.41	3.39	-	18.88	-	-	11.01	-	-	-	95.12
C-4/4	39.08	1.22	21.45	4.61	0.04	22.35	0.05	0.30	10.16	0.96	0.18	0.19	100.59
C-4/7	38.51	1.39	21.70	3.64	0.06	18.99	-	0.21	10.48	1.87	0.24	0.10	97.19
C-4/26	40.62	1.34	21.88	3.58	-	19.21	-	-	10.96	-	-	-	97.59
C-4/17	39.03	1.39	22.18	3.58	-	19.10	-	-	11.44	-	-	-	96.72
C-11/5	38.58	1.10	22.22	5.01	0.08	20.35	0.05	0.29	10.41	1.12	-	0.13	99.34
C-11/24	37.57	0.42	22.71	2.74	-	18.93	-	-	11.31	-	3.20	-	96.88
Df2	39.29	0.63	23.20	3.00	-	19.10	0.32	-	11.60	-	-	-	97.14
C-4/31	37.67	0.93	24.12	5.06	0.05	19.95	0.04	0.40	10.26	0.63	0.05	0.14	99.30
Recalculated on 8 cations (in apfu)													
Df1	3.01	0.07	1.33	0.03	-	2.53	-	-	1.03	-	-	-	-
C-11/3	2.77	0.06	1.56	0.34	-	2.18	-	0.13	0.95	-	-	-	-
C-41/3	2.83	0.08	1.83	0.21	-	2.04	-	-	1.02	-	-	-	-
C-4/4	2.69	0.06	1.74	0.27	-	2.29	-	0.04	0.89	0.21	0.010	0.01	-
C-4/7	2.79	0.08	1.85	0.22	-	2.05	-	0.03	0.97	0.43	0.014	0.006	-
C-4/26	2.88	0.07	1.83	0.21	-	2.03	-	-	0.99	-	-	-	-
c-4/17	2.78	0.07	1.86	0.21	-	2.03	-	-	1.04	-	-	-	-
C-11/5	2.70	0.06	1.84	0.29	-	2.13	-	0.04	0.93	0.25	-	0.007	-
C-11/24	2.68	0.02	1.91	0.16	-	2.01	-	-	1.03	-	0.18	-	-
Df2	2.78	0.03	1.93	0.18	-	2.01	0.02	-	1.05	-	-	-	-
C-4/31	2.62	0.05	1.98	0.29	-	2.07	-	0.05	0.91	0.14	0.003	0.008	-

Analyses of Df1 and Dr2 are from [9]. NiO content of 0.03 and 0.05 wt.% was detected in samples C-4/4 andC-4/31

Table S5. Chemistry of plagioclase group minerals.

Number of Sample	Oxides (wt.%)										
	SiO_2	TiO_2	Al_2O_3	FeO_t	MgO	CaO	Na_2O	K_2O	Cr_2O_3	V_2O_3	Total
C-23/6	67.82	0.12	20.96	-	-	1.28	11.06	0.07	-	0.07	101.38
C-23/2	65.83	0.01	21.79	-	0.01	2.55	10.44	0.08	0.01	0.04	100.76
C-23/4	64.37	-	22.90	-	-	3.25	10.17	0.22	-	-	100.91
C-23/3	60.28	0.18	24.72	0.01	0.01	6.02	7.91	0.17	-	0.07	99.37
C-23/5	60.45	0.02	24.70	0.06	0.02	6.32	7.91	0.18	0.09	-	99.75
C-23/1	60.07	0.06	25.18	-	0.01	6.53	7.54	0.25	-	0.05	99.69
C-23/7	60.11	0.03	25.42	-	-	6.55	8.03	0.17	0.04	0.04	100.39
C-2/5	59.86	0.13	25.65	0.02	0.02	6.80	7.57	0.17	0.02	0.07	100.31
C-2/3	59.11	0.28	25.15	-	0.02	7.04	7.44	0.18	0.08	0.02	99.32
C-2/2	59.28	0.03	25.59	0.01	0.01	7.11	7.60	0.11	-	0.01	99.75
C-2/4	58.69	-	26.51	0.01	0.01	7.91	7.45	0.22	0.03	-	100.83
C-2/1	57.67	0.01	27.27	0.03	0.02	8.57	7.02	0.11	0.03	-	100.73
	Recalculated on 5 cations (in apfu)										% An
C-23/6	2.93	0.004	1.07	-	-	0.06	0.93	-	-	0.002	6
C-23/2	2.87	0.000	1.12	-	-	0.12	0.88	-	-	0.001	12
C-23/4	2.80	0.000	1.18	-	-	0.15	0.86	0.01	-	-	15
C-23/3	2.70	0.006	1.31	0.002	-	0.29	0.69	0.01	-	0.003	29
C-23/5	2.70	0.001	1.30	-	-	0.30	0.68	0.01	0.003	-	30
C-23/1	2.69	0.002	1.33	-	-	0.31	0.65	0.01	-	0.002	32
C-23/7	2.66	0.001	1.33	0.001	-	0.31	0.69	0.01	0.001	0.001	31
C-2/5	2.66	0.004	1.34	-	-	0.32	0.65	0.01	0.001	0.002	33
C-2/3	2.66	0.009	1.33	-	-	0.34	0.65	0.01	0.003	0.001	34
C-2/2	2.65	0.001	1.35	-	-	0.34	0.66	0.01	-	-	34
C-2/4	2.59	0.000	1.38	-	-	0.37	0.64	0.01	0.001	-	37
C-2/1	2.56	0.000	1.42	0.001	-	0.41	0.60	0.01	0.001	-	40

Table S6. Chemistry of scapolite group minerals.

Number of sample	Component (wt.%)														
	SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	Cl	F	S	Cr_2O_3	V_2O_3	Total
C-10/11	59.04	0.02	23.90	0.02	-	-	7.29	6.57	0.10	0.01	-	0.02	-	0.07	97.04
Df	53.55	-	20.70	-	-	-	7.34	8.94	0.66	-	-	0.30	-	-	91.49
C-10/4	53.56	-	23.72	0.04	0.06	-	9.42	7.63	0.86	2.29	-	0.01	0.09	-	97.68
C-10/21	51.87	-	26.62	-	0.02	0.02	10.89	8.15	0.83	2.18	-	-	-	0.18	100.76
C-10/8	52.68	0.03	23.86	0.03	0.03	-	10.96	7.12	0.60	1.97	0.25	-	-	0.07	97.60
C-11	51.13	-	27.52	0.04	0.04	-	11.51	6.88	0.70	2.64	0.13	-	-	-	100.59
C-11/30	51.90	-	27.18	0.03	0.02	-	11.91	6.41	0.43	1.53	0.02	-	0.05	0.02	99.50
C-11/27	45.78	0.01	26.61	0.04	-	0.02	16.77	3.84	0.19	0.27	0.02	0.01	0.03	-	93.60
C-11/14	46.19	0.05	27.17	0.10	-	0.02	17.79	3.36	0.02	0.07	-	0.01	0.04	-	94.82
Recalculated on 16 cations (in apfu)															
															%Me
C-10/11	8.75	0.002	4.18	0.002	-	-	1.16	1.89	0.02	0.003	-	0.006	-	0.008	36
Df	8.24	-	3.75	-	-	-	1.21	2.67	0.13	-	-	0.086	-	-	23
C-10/4	7.97	-	4.16	0.005	0.008	-	1.50	2.20	0.16	0.577	-	0.003	0.011	-	28
C-10/21	7.41	-	4.48	-	0.002	0.004	1.67	2.26	0.15	0.528	-	-	-	0.019	31
C-10/8	7.86	0.003	4.19	0.004	0.004	-	1.75	2.06	0.11	0.498	0.118	-	-	0.008	35
C-11	7.42	-	4.71	0.005	0.005	-	1.79	1.94	0.13	0.650	0.060	-	-	-	36
C-11/30	7.57	-	4.67	0.004	0.002	-	1.86	1.81	0.08	0.378	0.009	-	0.006	0.002	41
C-11/27	7.11	0.001	4.87	0.005	-	0.005	2.79	1.16	0.04	0.071	0.010	0.003	0.003	-	65
C-11/14	7.11	0.006	4.93	0.013	-	0.005	2.93	1.00	0.00	0.018	-	0.003	0.005	-	74

The sample Df is average concentration of oxides in scapolite group of minerals from [9].

Table S7. Chemistry of titanite.

Number	Number of Sample	Component (wt.%)												
		SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	F	Cr_2O_3	V_2O_3	Сумма
1	C-2/46	31.14	31.10	6.63	0.03	0.03	0.02	28.96	0.10	-	2.02	0.07	0.61	100.71
2	C-2/48	31.12	30.43	6.72	0.05	-	0.04	28.35	0.08	0.02	1.95	0.11	0.78	99.65
3	C-11/25	31.06	30.13	6.80	0.06	0.02	0.05	28.71	0.12	-	2.00	0.10	0.53	99.58
4	C-11/28	30.94	34.38	4.31	0.06	0.02	0.01	28.51	0.08	0.02	1.40	0.10	0.71	100.54
5	C-11/31	30.68	29.34	6.40	0.08	0.03	0.03	28.97	0.11	0.01	3.26	0.06	0.42	99.39
6	C-10/37	30.74	31.00	5.26	0.02	-	0.05	28.00	0.09	0.01	3.52	0.07	0.78	99.54
7	C-4/35	30.95	25.68	9.59	0.07	-	0.08	28.77	0.01	0.05	3.87	0.05	0.71	99.83
8	C-4/39	30.59	26.95	8.26	0.09	0.02	0.03	28.92	0.09	0.01	4.18	0.05	0.39	99.58
9	C-41/51	31.22	25.57	9.76	0.07	-	0.07	28.99	0.07	-	4.63	0.07	0.32	100.77
10	C-41/52	30.28	27.55	8.04	0.08	-	0.04	28.06	0.07	-	3.13	0.24	0.45	97.94

NiO value of 0.01 wt.% was detected in sample C-11/28.

Table S8. Chemistry of rutile.

Number of Sample	Component (wt.%)												
	SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	F	Cr_2O_3	V_2O_3	Total
C-5	0.03	99.36	0.06	0.11	-	0.05	1.10	-	0.04	-	0.23	1.87	102.85
C-7	0.04	93.80	0.08	0.08	0.01	0.01	0.22	0.05	0.01	0.26	0.39	1.82	96.77
C-11	0.02	92.41	0.12	0.05	-	0.02	0.03	-	0.02	-	0.35	1.38	94.40
C-2	0.34	94.43	0.17	0.10	0.01	0.01	0.21	0.01	0.10	0.11	0.21	1.50	97.20
C-9	0.05	96.70	0.06	0.13	0.03	0.01	0.51	-	0.01	0.18	0.20	1.58	99.46
C-41	0.06	93.24	1.16	0.03	-	0.05	0.06	0.01	0.03	-	0.41	1.44	96.49
C-17	0.01	96.85	0.10	0.10	0.04	0.02	0.04	-	0.04	-	0.65	1.59	99.44
C	0.10	97.14	0.09	0.20	-	0.05	-	0.01	0.02	0.13	0.44	1.87	100.05
C-20	0.09	95.64	0.07	0.01	0.04	0.10	0.21	0.02	0.01	0.31	0.88	3.06	100.44
C-20/1	0.06	95.92	0.04	0.03	0.05	0.01	0.14	0.08	0.01	-	0.69	2.41	99.44

P_2O_5 up to 0.13 wt.% was detected in sampleC-5;NiO up to 0.04, 0.01 and 0.03 wt.% were detected in the sample C – 17, C and C-20

Table S9. Chemistry of tourmaline group minerals.

Number	Component (wt.%)												
	SiO_2	TiO_2	Al_2O_3	FeO_t	MnO	MgO	CaO	Na_2O	K_2O	F	Cr_2O_3	V_2O_3	Сумма
C-2	36.03	0.14	36.33	6.42	0.03	6.32	0.29	2.38	-	-	0.15	0.39	88.48
C-5	36.95	0.35	37.03	4.43	-	6.60	0.45	2.39	0.07	0.16	0.05	0.12	88.60
C-7	36.58	0.34	31.04	2.47	-	9.28	0.98	2.57	0.02	0.57	0.21	0.14	84.20
C-9	37.71	0.25	36.63	0.87	0.03	9.41	0.64	2.42	0.01	0.17	0.70	0.32	89.16
C-15	37.31	0.23	36.35	0.95	0.01	9.66	0.69	2.51	0.05	0.19	0.75	0.58	89.28
C-23	37.99	0.43	32.18	1.50	0.01	10.57	0.26	3.25	0.20	1.31	0.19	0.07	87.96
C-33	40.06	0.18	38.55	0.94	0.03	11.56	0.19	2.44	0.04	0.08	0.07	0.57	94.71
C-41	40.22	0.23	38.63	0.93	-	11.56	0.27	2.48	0.04	0.03	0.08	0.40	94.87

P_2O_5up to 0.20 wt.% and NiO up to 0.05 wt.% were detected in sample C-7; NiOup to 0.07 wt.% was detected in sample C – 23.

Table S10. Chemistry of corundum by using EMPA (in wt.%).

Number	Colour of Sample	Number of Sample	SiO_2	TiO_2	Al_2O_3	FeO_t	NiO	MgO	CaO	K_2O	Na_2O	Cr_2O_3	V_2O_3	Total
1	Red	C-41/30	0.03	-	98.94	0.19	0.06	0.02	-	0.01	0.01	0.55	0.02	99.83
2	Red	C-41/34	0.06	0.01	99.55	0.16	-	0.03	-	-	0.01	0.36	0.01	100.19
3	Pink	C-10/5	0.05	-	98.65	0.05	0.03	-	0.02	0.01	-	0.16	-	98.97
4	Pink	C-23/40	0.02	0.06	99.10	0.06	0.05	0.04	0.01	0.01	0.04	0.14	0.01	99.54
5	Red	C-41/33	0.06	0.02	98.84	0.06	0.05	0.03	0.03	-	0.03	0.71	0.04	99.87
6	Pink	C-23/41	0.02	0.09	98.76	0.05	-	-	0.04	-	-	0.15	0.03	99.14
7	Pink	C-23/44	0.06	0.11	99.32	0.06	0.04	0.04	0.03	-	0.01	0.18	0.02	99.87
8	Bright pink	C-10/25	0.05	0.01	99.02	0.07	0.02	0.01	0.02	-	0.03	0.01	-	99.24
9	Pink	C-2/19	0.04	0.17	98.85	0.04	0.03	-	0.01	0.01	0.01	0.21	0.03	99.40
10	Bright pink	C-2/21	0.03	0.05	99.10	0.04	-	0.01	0.03	-	0.02	0.05	0.04	99.37
11	Red	C-41/38	0.02	0.03	99.69	0.04	0.03	0.02	-	0.01	0.01	0.36	0.07	100.28
12	Pink	C-2/23	0.03	0.03	99.11	0.06	0.01	0.02	-	-	-	0.21	0.04	99.51

Table S11. Chemistry of corundum obtained by LA-ICP-MS (in μg/g).

No Sample/Element	Mg	Ti	V	Cr	Fe	Ga	Ga/Mg	Fe/Ti	Cr/Ga	Fe/Mg
1	12.7	49.6	42.5	2760	450	76.2	6.0	9.1	36.2	35.5
2	13.2	46.1	41.3	2590	448	74.1	5.6	9.7	34.9	33.9
3	13.5	58.7	39.2	1940	435	71.9	5.3	7.4	27.0	32.3
4	11.3	42.2	40.5	2280	420	73.8	6.5	9.9	30.9	37.1
5	13.4	58.8	40.9	1340	439	74.1	5.5	7.5	18.1	32.8
6	12.4	66.1	40.5	1410	432	69.2	5.6	6.5	20.4	34.8
7	15.3	146	44.4	900	430	70.1	4.6	2.9	12.8	28.1
8	13.9	130	39.2	753	401	71.0	5.1	3.1	10.6	29.0
9	15.4	144	41.2	871	399	65.9	4.3	2.8	13.2	25.9
10	14.6	177	41.6	909	414	66.3	4.5	2.3	13.7	28.3
11	9.28	22.8	36.6	512	418	73.8	8.0	18.3	6.9	45.0
12	9.07	19.2	35.4	2380	450	68.6	7.6	23.5	34.7	49.6
13	9.71	13.9	39.8	2760	439	68.6	7.1	31.6	40.2	45.3
14	11.0	20.8	40.5	2990	467	71.7	6.5	22.5	41.7	42.6
15	11.5	24.1	41.3	3100	456	71.1	6.2	18.9	43.6	39.5
16	10.0	20.7	39.3	2960	450	71.7	7.1	21.8	41.3	44.9
17	11.1	66.6	68.1	1750	393	76.4	6.9	5.9	22.9	35.4
18	9.36	26.1	65.1	1860	371	70.3	7.5	14.2	26.4	39.6
19	8.87	16.2	69.1	2140	396	72.7	8.2	24.4	29.4	44.6
20	14.9	30.1	81.2	2510	438	78.9	5.3	14.5	31.8	29.4
21	10.2	23.3	79.9	2490	423	74.0	7.2	18.2	33.7	41.3
22	20.3	73.9	113	4270	610	96.4	4.8	8.2	44.3	30.0
23	13.7	41.0	109	4620	570	91.2	6.6	13.9	50.7	41.6
24	20.2	27.3	98.2	4420	524	86.4	4.3	19.2	51.1	26.0
25	21.2	83.5	124	4590	623	90.7	4.3	7.5	50.6	29.4
26	26.9	117	123	4720	595	92.5	3.4	5.1	51.0	22.1
27	9.71	29.4	84.1	2860	497	91.2	9.4	16.9	31.4	51.2
28	10.1	24.8	81.9	2700	501	83.5	8.3	20.2	32.3	49.6
29	25.5	25.8	90.9	4120	482	87.7	3.4	18.7	47.0	18.9
30	13.9	39.9	96.4	3020	516	80.8	5.8	12.9	37.4	37.2
31	9.59	17.9	79.9	2770	460	81.1	8.5	25.6	34.2	47.9
32	14.0	31.6	108	3820	557	96.3	6.9	17.6	39.7	39.8
33	12.8	23.9	109	3860	585	89.9	7.0	24.5	42.9	45.9
34	13.2	26.5	103	3600	542	85.7	6.5	20.5	42.0	40.9
35	12.0	24.6	105	3770	555	92.3	7.7	22.6	40.9	46.1
36	21.1	57.4	107	3950	577	89.7	4.3	10.1	44.0	27.4
37	18.3	65.1	110	3760	598	94.9	5.2	9.2	39.6	32.6
38	13.3	46.6	98.5	3900	570	90.6	6.8	12.2	43.1	42.8
39	14.6	44.0	102	3920	571	102	7.0	13.0	38.5	39.0
40	12.8	31.1	106	3900	540	95.0	7.4	17.3	41.1	42.3
41	19.3	59.1	120	4410	609	98.1	5.1	10.3	44.9	31.5

Table S12. Chemistry of ruby-bearing samples (wt.%).

Component	Number of Sample													
	C-2	**C-4**	**C-7**	**C-10**	**C-16**	**C-16/1**	**C-9**	**C-41**	**C-17**	**C**	**C/0**	**C-20**	**C-21**	**C-21/1**
SiO_2	47.19	46.27	48.61	53.53	52.26	43.00	48.54	47.41	43.60	30.67	16.08	47.74	3.61	23.83
TiO_2	1.84	2.75	2.43	2.22	3.11	1.17	2.53	2.63	1.87	2.70	0.90	2.19	0.44	1.44
Al_2O_3	39.30	34.69	25.55	28.75	28.17	45.54	28.89	30.64	36.40	50.10	66.36	31.53	91.40	37.50
FeO	0.40	0.99	0.30	0.35	0.39	0.17	0.10	0.84	2.03	0.86	2.77	0.50	0.06	0.09
MnO	-	0.01	-	-	-	-	-	0.01	0.02	0.01	0.01	-	0.03	0.03
MgO	0.09	0.08	0.41	0.92	1.27	0.26	0.58	0.96	0.84	0.05	2.05	0.15	0.36	0.21
CaO	4.55	5.03	9.73	4.85	4.99	4.30	3.95	5.32	3.81	8.31	3.27	1.62	1.17	21.07
K_2O	0.97	1.98	0.88	5.09	5.67	0.75	6.11	5.08	3.84	2.75	5.17	8.23	1.09	0.94
Na_2O	4.70	5.10	11.48	3.35	2.91	4.20	4.17	2.10	3.36	4.04	2.31	3.16	0.38	2.14
P_2O_5	0.07	0.06	0.27	0.10	0.31	0.15	0.23	0.08	0.14	0.07	0.04	0.15	0.01	0.13
Cr_2O_3	0.65	0.14	0.18	0.17	0.14	0.07	0.19	0.05	0.05	-	0.08	0.22	0.43	0.05
S	0.04	0.03	0.14	0.11	0.11	0.06	0.03	-	-	-	-	0.05	0.08	0.51
Cl	0.07	-	0.11	0.10	0.07	0.07	-	-	-	-	-	-	0.11	-
Ni	-	0.002	-	0.02	0.01	-	0.002	0.001	0.002	-	-	0.005	0.002	0.005
Cu	-	0.001	0.08	0.01	-	0.02	0.001	0.001	0.002	-	-	0.001	0.002	0.004
Zn	-	0.003	0.04	0.01	0.01	0.01	0.003	0.004	0.002	-	-	0.003	0.01	0.002
Ga	0.005	-	0.018	0.007	0.008	-	-	0.004	0.005	-	-	-	0.015	-
Rb	0.003	0.004	0.007	0.016	0.019	0.003	0.01	0.01	0.008	-	-	0.03	0.01	-
Sr	0.07	0.09	0.34	0.20	0.20	0.13	0.20	0.1	0.12	-	-	0.10	0.18	0.08
V	-	0.04	-	0.002	0.001	0.002	0.04	0.04	0.033	-	-	0.05	0.11	0.008
Zr	0.03	0.06	0.09	0.05	0.04	0.03	0.07	-	0.047	-	-	0.04	0.05	0.03
Nb	0.003	0.004	0.008	-	0.005	0.002	0.005	0.002	-	-	-	0.004	0.002	0.004
Th	-	-	-	-	0.01	0.04	-	0.002	0.003	-	-	-	0.002	-
Ba	0.02	0.02	0.10	0.09	0.10	-	0.07	0.07	0.05	-	-	0.10	0.09	0.01
La	-		0.10	-	0.06	-		0.006	0.008	-	-		0.01	-
Ce	-		0.11	-	0.07	-	4.41	0.01	0.015	-	-	4.38	0.08	-
LOI	-	2.84	-	-	-	-	-	-	-	-	-	-	-	11.19
Total	100.00		100.98	99.95	100.04	99.98		95.37	96.26	99.56	99.04		99.63	

Table S13. Geochemistry of rutile grains used for in situ U-Pb LA-ICP-MS geochronology.

No sample/ Element	V	Cr	Zr	Nb	Mo	Sn	Sb	Hf	Ta	W	Pb	Th	U	$T°(C)_{rutile}$
1	3865	3589	2150	4950	bdl	213	bdl	67.0	392	35.7	bdl	0.078	38.6	837
2	4763	3410	2012	4582	0.44	197	bdl	63.3	315	25.5	21.6	14.2	23.9	829
3	4832	3447	2278	4611	bdl	202	bdl	69.7	304	33.2	10.8	9.04	38.2	844
4	4184	3695	2048	4552	0.48	190	bdl	65.6	253	16.4	1.31	0.66	31.0	831
5	4577	3721	1967	4741	0.86	186	bdl	62.5	332	28.6	5.3	2.39	31.8	826
6	4889	3459	1954	4138	bdl	229	bdl	64.0	231	17.0	67.9	52.2	32.0	826
7	4857	3112	2007	4414	0.43	183	bdl	67.1	235	13.5	2.6	3.11	29.8	829
8	4896	3583	2648	5264	bdl	223	bdl	84.7	403	72.5	2.12	0.4	45.7	862
9	4464	3088	2081	3521	bdl	223	bdl	66.2	227	14.1	bdl	0.013	27.9	833
10	3431	3169	2212	6078	1.05	235	bdl	52.5	372	41.6	1.07	1.76	25.5	840
11	3190	3587	1985	5215	bdl	213	bdl	58.4	264	11.7	0.143	0.27	31.8	827
12	3224	3466	1830	4966	0.58	210	bdl	71.5	290	12.2	0.143	0.036	25.2	818
13	4001	5402	1861	6169	bdl	199	bdl	64.5	306	14.5	bdl	0.005	30.0	820
14	3839	2749	1634	3910	0.71	205	1.6	54.6	243	10.9	2.26	0.65	20.6	805
15	4700	3795	1657	4100	0.99	199	2.11	65.3	280	17.9	0.96	7.63	13.5	807
16	4522	3644	1587	4103	bdl	173	bdl	58.7	276	19.5	0.173	0.35	24.0	802
17	4861	4308	2145	4386	0.81	232	bdl	68.6	297	57.2	0.63	0.008	32.6	837
18	4123	3257	1900	3624	bdl	198	bdl	70.8	291	20.6	0.138	0.012	31.3	822
19	4281	3093	1851	2997	bdl	192	bdl	71.9	223	19.1	bdl	0.008	32.9	819
20	4204	3751	2110	4467	0.89	241	1.52	73.1	327	59.1	53.3	20.8	41.1	835
21	4232	3788	1764	3671	bdl	214	bdl	66.4	244	14.5	bdl	0.004	31.0	814
22	4744	3675	1727	3532	0.37	201	bdl	63.5	205	14.3	bdl	0.165	30.6	811

Sample	Rb, μg/g	Sr, μg/g	$^{87}Rb/^{86}Sr$	± 2σ	$^{87}Sr/^{86}Sr$	± 2σ	$(^{87}Sr/^{86}Sr)_0$	$(^{87}Sr/^{86}Sr)^{UR}_t$	εSr(T)
Phlogopite 1	203	134	4.3814	0.0438	0.709255	0.000009	0.708011	0.704476	50
Phlogopite 2	192	161	3.4461	0.0345	0.709077	0.000009	0.708098	0.704476	51
Phlogopite 3	192	160	3.4710	0.0347	0.709113	0.000011	0.708127	0.704476	52
Plagioclase 1	35	2039	0.0503	0.0005	0.707909	0.000010	0.707894	0.704476	49
Plagioclase 2	57	1250	0.1310	0.0013	0.707950	0.000007	0.707913	0.704476	49
Plagioclase 3	36	1374	0.0764	0.0008	0.707938	0.000006	0.707917	0.704476	49
Bulk rock 1	51	1079	0.1360	0.0014	0.707953	0.000012	0.707914	0.704476	49
Bulk rock 2	58	1146	0.1457	0.0015	0.707956	0.000006	0.707914	0.704476	49

Table S14. Rb-Sr and Sm-Nd isotope measurements of phlogopite, plagioclase, and ruby-bearing rock from Snezhnoe deposit.

Sample	Rb, μg/g	Sr, μg/g	$^{87}Rb/^{86}Sr$	± 2σ	$^{87}Sr/^{86}Sr$	± 2σ	$(^{87}Sr/^{86}Sr)_0$	$(^{87}Sr/^{86}Sr)^{UR}_t$	εSr(T)
Phlogopite 1	203	134	4.3814	0.0438	0.709255	0.000009	0.708011	0.704476	50
Phlogopite 2	192	161	3.4461	0.0345	0.709077	0.000009	0.708098	0.704476	51
Phlogopite 3	192	160	3.4710	0.0347	0.709113	0.000011	0.708127	0.704476	52
Plagioclase 1	35	2039	0.0503	0.0005	0.707909	0.000010	0.707894	0.704476	49
Plagioclase 2	57	1250	0.1310	0.0013	0.707950	0.000007	0.707913	0.704476	49
Plagioclase 3	36	1374	0.0764	0.0008	0.707938	0.000006	0.707917	0.704476	49
Bulk rock 1	51	1079	0.1360	0.0014	0.707953	0.000012	0.707914	0.704476	49
Bulk rock 2	58	1146	0.1457	0.0015	0.707956	0.000006	0.707914	0.704476	49

Table S14. *Cont.*

Sample	Sm, μg/g	Nd, μg/g	$^{147}Sm/^{144}Nd$	±2σ	$^{143}Nd/^{144}Nd$	±2σ	$(^{143}Nd/^{144}Nd)_0$	$(^{143}Nd/^{144}Nd)^{CHUR}_t$	εNd(T)	T(DM)	T(CHUR)
Phlogopite	1.1	7.4	0.09181	0.00009	0.512325	0.000001					
Plagioclase 2	1.0	6.2	0.09842	0.00010	0.512132	0.000005					
Bulk rock 1	6.8	41.2	0.09955	0.00010	0.512134	0.000005	0.51212	0.51261	-9.6	1.31	0.79
Bulk rock 2	7.3	43.9	0.10032	0.00010	0.512133	0.000008	0.51212	0.51261	-9.6	1.32	0.80