

Finger et al., 2017, Identification of discrete low-temperature thermal events in polymetamorphic basement rocks using high spatial resolution FE-SEM-EDX U-Th-Pb dating of uraninite microcrystals: Geology, doi:10.1130/G39370.1.

**Table DR1: Sample descriptions and GPS locations**

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The **K1 gneiss** is a generally fine-grained and commonly leucocratic orthogneiss of granitic to granodioritic composition. The investigated sample (GPS location E 12°28' 23", N 47°12' 17") is a slightly darker coloured variety with elevated biotite content (10 vol. %). In addition, the rock consists of ~40 % albitic plagioclase, ~35 % quartz and 15 % K-feldspar. The fabric is metamorphic, and relict magmatic feldspar is very rare. Accessory minerals are muscovite, calcite, apatite, zircon, titanite, allanite, epidote, clinozoisite, zoisite, garnet, scheelite, uraninite, pyrrhotite and chalcopyrite. The magmatic formation age of the rock has been determined by U–Pb zircon dating to be  $339.6 \pm 1.2$  Ma (Kozlik et al. 2016). Geochemically, the K1 gneiss has been classified as weakly peraluminous I-type to A-type biotite granite (Finger et al. 1985, Kozlik and Raith 2014). It experienced a significant tungsten enrichment during a late magmatic hydrothermal stage (Raith et al. 2015).

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The **Felbertauern augengneiss** is a medium- to coarse-grained gneiss, with ~1 cm K-feldspar augens. The matrix consists of quartz, albitic plagioclase and partly chloritized biotite. The rock composition is granitic. Accessory minerals are calcite, muscovite, chlorite, allanite, epidote, apatite, titanite and zircon. The fabric is mylonitic. The investigated sample is from the Felbertal (GPS location E 12°30' 02", N 47°10'06").

The magmatic formation age of the Felbertauern Augengneiss has been determined by U–Pb zircon dating to be  $338.5 \pm 1.3$  Ma (Kozlik et al. 2016) and  $340 \pm 4$  Ma (Eichhorn et al. 2000).

Geochemically, the Felbertauern Augengneiss can be described as weakly peraluminous I-type to A-type biotite granite (Finger et al. 1993, Schermaier 1993, Kozlik and Raith 2014).

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The **Granatspitz granite gneiss** is a leucocratic, medium- to coarse-grained orthogneiss. It typically contains biotite and muscovite, with common K-feldspar augens. The investigated sample from the Tauernmoos lake (GPS location E 12°38' 53", N 47°09' 22") is stronger deformed and finer grained than the typical Granatspitz granite gneiss. It contains approximately 20 % of muscovite, 10 % biotite, 30 % quartz, 20 % plagioclase and 20 % K-feldspar. Accessory minerals are monazite, apatite, zircon, epidote and garnet.

The magmatic formation age of the Granatspitz granite has been determined by U–Pb zircon dating to be  $271 \pm 4$  Ma (Eichhorn et al. 2000).

The Granatspitz Gneiss has an S-type granite composition (Finger et al. 1993, Schermaier 1993).

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The **Reichenspitz aplite gneiss** is a fine- to medium-grained leucocratic rock. It consists of approximately one third of each K-feldspar, plagioclase and quartz. Biotite content is only at around 3 %. Parts of the rock are recrystallized, however, relict primary feldspars are abundant. Accessory minerals are epidote, clinozoisite, apatite, zircon, allanite, calcite, pyrite and fluorite. The investigated sample was collected near the Gamseck waterfall (GPS location E 12°15' 29", N 47°11'07").

The magmatic formation age of the Reichenspitz aplite gneiss has been determined as Lower Permian, i.e., at  $292 \pm 6$  Ma by U–Pb zircon dating (Eichhorn et al. 2000) and  $282 \pm 6$  Ma by a Rb–Sr whole rock isochron (Besang et al. 1968).

The Reichenspitz Gneiss has an A-type granite composition (Finger et al. 1993, Schermaier 1993).

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**Table DR2: Whole rock geochemistry data**

	K1 Gneiss	Felbertauern Augengneiss	Granatspitz Gneiss	Reichenspitz Aplite Gneiss
SiO <sub>2</sub>	72.67	72.39	69.67	75.58
TiO <sub>2</sub>	0.24	0.38	0.24	0.08
Al <sub>2</sub> O <sub>3</sub>	12.57	12.85	15.83	12.67
FeO <sub>tot</sub>	1.93	2.22	1.65	1.30
MnO	0.08	0.04	0.03	0.03
MgO	1.03	1.50	0.42	0.11
CaO	1.69	1.65	1.28	0.62
Na <sub>2</sub> O	2.55	2.81	3.01	4.11
K <sub>2</sub> O	5.40	5.02	5.09	4.81
P <sub>2</sub> O <sub>5</sub>	0.24	0.24	0.23	0.02
LOI	0.90	0.65	1.84	0.58
Total	99.30	99.75	99.29	99.91
Cr	100	40	7	2
Ni	15	18	b.d.l.	2
Co	3	6	b.d.l.	1
V	35	n.d.	n.d.	2
Zn	45	n.d.	n.d.	44
Rb	579	213	249	200
Ba	519	400	339	14
Sr	128	188	81	9
Nb	48	25	1	20
Zr	128	193	93	130
Y	29	34	11	32
Th	32	50	16	22
U	48	8	8	12

XRF data. Major elements in wt.%, trace elements in ppm, b.d.l.= below detection limit, n.d.= not determined

**Table DR3: Representative single point analyses of uraninite from the four rocks studied and the standards**

Grain	SiO <sub>2</sub>	CaO	Y <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	Dy <sub>2</sub> O <sub>3</sub>	Er <sub>2</sub> O <sub>3</sub>	Yb <sub>2</sub> O <sub>3</sub>	ThO <sub>2</sub>	UO <sub>2</sub>	PbO	Age (Ma)	Error (Ma)
<b>Standard Erzgebirge</b>												
1a	-	-	0.46	-	-	-	-	0.42	94.86	4.27	328	20
1a	-	-	0.47	-	-	-	-	0.42	94.86	4.24	327	20
1a	-	-	0.45	-	-	-	-	0.42	94.95	4.18	321	20
1a	-	-	0.42	-	-	-	-	0.42	94.90	4.26	328	20
1a	-	-	0.43	-	-	-	-	0.42	94.88	4.27	329	20
1b	-	-	-	-	-	-	-	0.86	94.88	4.26	328	20
1c	-	-	-	-	-	-	-	0.42	95.09	4.48	344	20
<i>Microprobe<sup>a</sup></i>	<i>n.a.</i>	<i>n.a.</i>	<i>0.39</i>	-	<i>0.08</i>	<i>0.11</i>	-	<i>0.39</i>	<i>94.75</i>	<i>4.27</i>	<i>329</i>	<i>16</i>
<b>Standard Mitterberg</b>												
1a	0.33	0.49	0.70	-	-	-	-	0.77	96.59	1.12	87	20
1b	0.28	0.44	1.23	-	-	-	-	0.59	96.27	1.18	92	20
2a	0.35	0.47	0.64	-	-	-	-	0.58	96.74	1.22	94	20
2b	-	0.41	0.72	-	-	-	-	0.32	97.47	1.07	83	20
1a ( <i>Microprobe</i> )	-	0.33	0.59	-	-	-	-	0.61	97.31	1.16	89	2
2b ( <i>Microprobe</i> )	-	0.35	0.65	-	-	-	-	0.22	97.57	1.21	93	2
<b>K1-Gneiss (1<sup>b</sup>)</b>												
1	-	-	2.51	-	-	-	-	4.32	89.86	3.32	267	21
2a	-	-	2.99	-	-	-	-	3.40	90.43	3.18	256	21
2b	-	-	3.06	-	-	-	-	4.33	89.12	3.48	283	21
3a	-	0.37	2.39	-	-	-	0.35	4.88	88.80	3.22	262	22
3a	-	1.05	2.62	-	-	0.51	0.94	4.18	87.59	3.12	258	22
4	-	0.51	3.21	-	-	0.50	0.95	4.14	87.54	3.15	261	22
5	-	0.43	2.30	-	-	0.33	0.57	4.80	88.43	3.15	258	22
6	-	-	3.04	-	0.39	0.52	0.61	4.18	90.90	0.37	30	22
<b>Augengneiss (2<sup>b</sup>)</b>												
1	-	0.49	6.15	-	-	-	-	3.84	86.46	3.06	257	22
2	-	0.59	4.82	-	-	-	-	4.34	86.93	3.32	276	22
3a	-	0.34	1.97	-	-	-	-	0.64	96.74	0.30	24	21
3a	-	0.33	1.72	-	-	-	-	0.67	96.97	0.32	25	21
<b>Aplite Gneiss (3<sup>b</sup>)</b>												
1	0.76	0.59	4.44	-	0.38	0.55	0.79	7.57	82.23	2.69	234	23
2	0.46	0.95	2.88	-	-	-	-	3.67	89.49	2.55	208	22
3a	-	-	4.81	0.40	0.96	0.65	0.53	8.58	81.67	2.40	210	23
3a	-	0.32	4.66	0.42	0.80	0.61	0.44	8.14	82.12	2.49	217	23
3b	-	-	4.12	0.46	0.78	0.64	0.40	9.09	81.89	2.63	229	23
3c	-	-	4.38	0.45	0.81	0.66	0.43	8.32	82.48	2.48	216	23
<b>Granatspitz Gneiss (4<sup>b</sup>)</b>												
1	-	-	-	-	-	-	-	0.43	96.75	2.82	215	20
2	-	-	-	-	-	-	-	0.43	96.89	2.67	204	20
3	-	-	-	-	-	-	-	0.43	96.81	2.76	211	20
4	-	-	-	-	-	-	-	0.43	96.66	2.91	222	20
5a	-	-	-	-	-	-	-	0.46	96.76	2.77	212	20
5a	-	-	-	-	-	-	-	0.46	96.83	2.71	207	20
6	-	-	1.42	-	-	-	-	1.90	96.33	0.36	28	21
7	-	-	0.80	-	-	-	-	0.44	98.45	0.31	24	20
8	-	-	0.66	-	-	-	-	0.44	98.55	0.35	27	20
9	-	-	2.90	-	0.36	0.36	-	0.46	95.55	0.36	28	21
10	-	-	0.83	-	-	-	-	0.44	98.27	0.46	35	20
11	-	-	-	-	-	-	-	4.08	95.52	0.39	31	21
12	-	-	-	-	-	-	-	0.44	99.21	0.35	27	20
12 ( <i>Microprobe</i> )	-	0.02	0.07	-	-	-	-	0.50	99.02	0.38	29	2

- = below detection limit; <sup>a</sup> Förster (1999); <sup>b</sup> sample location in figure 1; all analyses normalized to 100%. Ages calculated according to Montel et al. (1997).

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