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Supplemental Material

S1. Analytical Methods

Table S1. Summary of mineral assemblages, microstructures and temperature data.

Table S2. Zircon U-Pb LA-ICP-MS data of the granitic rocks from the southern Chong Shan structural belt.

S1. ANALYTICAL METHODS

1. EBSD techniques

XZ sections (paralleling to lineation and normal to foliation) are cut from the samples and polished using Buehler Mastermet colloidal silica and Buehler grinder-polisher. The LPO data acquisition was finished on a Hitachi S-3400N-II scanning electron microscope mounted with Nordlys EBSD Model NL-II detector with the sections surface inclined at 70° to the incidental beam. The new technique can provide fast data acquisition of mineral grains or part of mineral grains of interest, with 0.1 µm spatial resolution and 0.5° angular resolution. Acceleration voltage of 15 kV is applied and working distance is 23 mm. EBSP analysis is finished using the HKL Channel 5 software package. LPO measurements were done on quartz grains using interactive mode due to the very large grain sizes of quartz in the rocks. Several representative windows (8–9) of 500 µm by 300 µm in size is chosen for LPO data acquisition. Most of such windows contain representative quartz grains. The data for all the windows are merged to form the data set for the sample. The interactive mode is a reliable way of collecting EBSP data from representative grains or subgrain within the field of view. All the LPO data are presented using equal area, lower hemisphere projection in a structural frame of foliation // XY plane and lineation // X direction.

2. LA-ICP-MS zircon U-Pb geochronology

Zircon LA-ICP-MS U-Pb dating and trace element analyses were conducted synchronously at the Mineral Laser Microprobe Analysis Laboratory (Milma Lab), China University of Geosciences, Beijing (CUGB), China. Laser sampling was performed using a NewWave 193UC excimer laser ablation system. The ablated material was transported by carrier gas into the plasma source of an Agilent 7900 ICP-MS. Detailed setting parameters for the instruments and experimental process are listed in Zhang et al. (2019). Off-line selection and integration of background and analyte signals, and time-drift correction and quantitative calibration for trace element analyses and U-Pb dating were performed using ICPMSDataCal software. Common Pb corrections were calculated using ComPbCorr#3.17 and concordia diagrams, and $^{206}\text{Pb}/^{238}\text{U}$ weighted mean plots were made using Isoplot. Zircon standards GJ-1

and Plesovice were analyzed as unknown samples that were inserted between 91500 and the samples. We obtained weighted mean $^{206}\text{Pb}/^{238}\text{U}$ ages of 599.2 ± 4.6 Ma (2SD, $n = 4$) for GJ-1 and 336.8 ± 2.9 Ma (2SD, $n = 4$) for Plesovice, which are within error of recommended values (Jackson et al., 2004; Sláma et al., 2008).

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Table S1. Summary of mineral assemblages, microstructures and temperature data

Location	Sample	Rock type	Mineral assemblage	Microstructures	Deformation temperature	Temperature indication
Granitic rocks (Unit I)	CS1675	Granitic gneiss	Qtz+Kfs+Pl+Bi	Gneissic structure, Qtz(GBM, rectangular band)		
	CS16114	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Polycrystalline quartz bands, Kfs(BLG)	570±50°C	o.a.
	CS1677	Granitic Mylonite	Qtz+Kfs+Pl+Bi+Mus	Qtz(triple junction), Kfs(BLG)		
	CS1680	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(triple junction); Kfs(BLG)		
	CS2015	Granitic gneiss	Qtz+Kfs+Pl+Bi	Gneissic structure		
	CS1684	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Kfs(Myrmekite, BLG)		
	CS1685	Granitic Mylonite	Qtz+Kfs+Pl+Bi+Mus	Qtz (rectangular band) Kfs (Myrmekite, SGR)		
	CS1687-1	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz (rectangular band) Kfs(Myrmekite, BLG)		
	CS1687-3	Granitic Mylonite	Qtz+Kfs+Pl+Mus	Qtz(triple junction, undulate extinction) ; Kfs(BLG)	600±50°C	o.a.
	CS2014-2	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(triple junction) ; Kfs(BLG)		
	CS1689	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Polycrystalline quartz bands, Kfs(Myrmekite, BLG)	500-650°C	s.s.
	CS1690	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Polycrystalline quartz bands, Kfs(Myrmekite, BLG)	500-650°C	
	CS1691	Granitic gneiss	Qtz+Kfs+Pl+Bi	Qtz (rectangular band) , Kfs(BLG)	500-650°C	o.a.

CS16119	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands, core-mantle structure)	525±50°C	o.a.
CS2025	Granitic Mylonite	Qtz+Kfs+Pl+Bi+Mus	Qtz(triple junction) ; Kfs(BLG)		
CS2026	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(triple junction) ; Kfs(BLG)		
CS2028	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(triple junction) ; Kfs(BLG)	525±50°C	o.a.
CS16120	Granitic Mylonite	Qtz+Kfs+Pl+Bi	SC, Qtz(Polycrystalline bands), Kfs(SGR)	570±50°C	o.a.
CS16122	Granitic gneiss	Qtz+Kfs+Pl+Bi	Qtz(triple junction) ; Kfs(Myrmekite)	500-650°C	s.s.
CS16123	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands); Kfs(Myrmekite)		
CS2029	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands)		
CS16140	Granitic gneiss	Qtz+Kfs+Pl+Bi	Kfs(Myrmekite)		
CS2035	Granitic gneiss	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands)		
CS16125-1	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Mica fish; Qtz(triple junction) ; Kfs(BLG)	500-650°C	s.s.
CS16125-2	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands); Kfs(Myrmekite)		
CS16128	Granitic Mylonite	Qtz+Kfs+Pl+Mus	Qtz(Polycrystalline bands); Kfs(BLG)	>650°C	s.s.
CS16126-2	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands); Kfs(BLG)	400-650°C	s.s.
CS16109-1	Granitic Mylonite	Qtz+Kfs+Pl+Bi+Mus	Qtz(Polycrystalline bands, SGR)	525±50°C	o.a.
CS1659	Granitic Mylonite	Qtz+Kfs+Pl+Mus	Qtz(SGR); oriented feldspar and muscovite grains	460±50°C	
CS1656	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(SGR); Kfs(BLG)	400-650°C	s.s.

	CS2040	Granitic Mylonite	Qtz+Kfs+Pl+Bi	Qtz(Polycrystalline bands); Kfs(BLG)	500-650°C	
Pt Chong Shan Group (Unit I)	CS2005-2	Sillimanite bearing schist	Qtz+Pl+Sil	Oriented sillimanite and quartz grains	500-650°C	s.s.
	CS2033-1	Mus-qtz schist	Qtz+Pl+Mus	Shear band, oriented muscovite grains; Qtz(Polycrystalline bands)		s.s.
	CS1678	Bi-Pl gneiss	Qtz+Pl+Bi	Qtz(Polycrystalline bands), Kfs(Myrmekite)	500-650°C	s.s.
	CS2028-1	Mus-Qtz schist	Qtz+Pl+Mus	Qtz(Polycrystalline bands)	525±50°C	o.a.
Low-grade belt (Unit II and III)	CS2018	Phyllite	Ser+Qtz	oriented sericite grains		
	CS2017	Phyllite	Ser+Qtz	Folding with axial cleavage		
	CS2031	Phyllite	Ser+Qtz	Domain structure		
	CS16112	Phyllite	Ser+Qtz	Oriented sericite grains		
	CS2047	Bi-Qtz schist	Qtz+Bi	Oriented biotite grains		
	CS1668	Metasandstone	Qtz+Bi	Qtz (BLG)		
	CS1669	Metasandstone	Qtz+Bi	Qtz (BLG)	350±50°C	o.a.
	CS1672	Phyllite	Ser+Qtz	Domain structure		
	CS2001	Mus-Qtz schist	Qtz+Mus	Oriented muscovite and quartz grains	280±50°C	o.a.

Bi-Biotite; Mus-Muscovite; Kfs-K-feldspar; Pl-Plagioclase; Qtz-Quartz; Ser-Sericite; BLG-Bulging recrystallization; SGR-Subgrain rotation recrystallization; GBM-Grain boundary migration; o.a.-opening angle; s.s.-slip system.

Table S2. Zircon U-Pb LA-ICP-MS data of the granitic rocks from the southern Chong Shan structural belt.

Spot number	Content		Th/U	Isotopic ration						Age (Ma)			
	Th	U		²⁰⁷ Pb/ ²⁰⁶ Pb	1σ	²⁰⁷ Pb/ ²³⁵ U	1σ	²⁰⁶ Pb/ ²³⁸ U	1σ	²⁰⁷ Pb/ ²³⁵ U	1σ	²⁰⁶ Pb/ ²³⁸ U	1σ
CS1682													
CS1682-04	522	25677	0.02	0.0519	0.0026	0.0268	0.0016	0.0039	0.0002	27.0	2.0	25.0	1.0
CS1682-05	102	16941	0.01	0.0518	0.0022	0.0297	0.0013	0.0042	0.0001	30.0	1.0	27.0	0.7
CS1682-13	239	18643	0.01	0.0477	0.0025	0.0300	0.0013	0.0046	0.0001	30.0	1.0	29.3	0.8
CS1682-17	469	19686	0.02	0.0461	0.0015	0.0264	0.0007	0.0042	0.0001	26.5	0.6	26.8	0.5
CS1682-25	398	30252	0.01	0.0461	0.0018	0.0270	0.0009	0.0043	0.0001	27.1	0.9	27.4	0.5
CS1682-28	673	33433	0.02	0.0506	0.0019	0.0302	0.0014	0.0043	0.0001	30.0	1.0	27.8	0.7
CS1682-29	942	19933	0.05	0.0461	0.0014	0.0252	0.0006	0.0040	0.0001	25.2	0.6	25.5	0.4
CS1649													
CS1649-01	293	20523	0.01	0.0470	0.0019	0.0293	0.0012	0.0045	0.0001	29.0	1.0	29.1	0.6
CS1649-02	198	14481	0.01	0.0465	0.0026	0.0291	0.0015	0.0045	0.0001	29.0	2.0	28.9	0.5
CS1649-03	672	19559	0.03	0.0481	0.0029	0.0277	0.0016	0.0046	0.0002	28.0	2.0	29.0	1.0
CS1649-25	266	14990	0.02	0.0389	0.0039	0.0304	0.0053	0.0048	0.0001	30.0	5.0	30.6	0.8
CS1649-12	221	16538	0.01	0.0494	0.0029	0.0329	0.0019	0.0047	0.0001	33.0	2.0	30.5	0.5
CS1649-07	212	16276	0.01	0.0458	0.0023	0.0292	0.0016	0.0047	0.0002	29.0	2.0	30.0	1.0
CS1649-18	233	15431	0.02	0.0423	0.0034	0.0282	0.0021	0.0046	0.0001	28.0	2.0	29.7	0.7
CS1649-09	152	12406	0.01	0.0461	0.0016	0.0286	0.0008	0.0045	0.0001	28.6	0.8	29.0	0.5
CS1649-24	441	18402	0.02	0.0383	0.0031	0.0241	0.0024	0.0042	0.0001	24.0	2.0	26.7	0.7
CS1649-23	193	12239	0.02	0.0382	0.0031	0.0237	0.0022	0.0042	0.0001	24.0	2.0	27.0	0.5
CS16123													
CS16123-2 03	2308	16319	0.14	0.0487	0.0008	0.0264	0.0005	0.0039	0.0000	26.4	0.5	25.2	0.2
CS16123-2 04	1000	23987	0.04	0.0472	0.0007	0.0258	0.0004	0.0040	0.0000	25.8	0.4	25.4	0.2
CS16123-2 05	1216	24245	0.05	0.0485	0.0010	0.0261	0.0005	0.0039	0.0000	26.2	0.5	25.1	0.2
CS16123-2 09	1667	26687	0.06	0.0483	0.0009	0.0255	0.0004	0.0038	0.0000	25.5	0.4	24.6	0.2
CS16123-2 11	1125	18378	0.06	0.0475	0.0009	0.0257	0.0004	0.0039	0.0000	25.8	0.4	25.3	0.2
CS16123-2 12	2108	26636	0.08	0.0506	0.0010	0.0269	0.0005	0.0039	0.0001	26.9	0.5	24.7	0.3
CS16123-2 15	2502	30044	0.08	0.0497	0.0008	0.0266	0.0006	0.0039	0.0001	26.6	0.5	24.8	0.3

CS16123-2 19	654	21151	0.03	0.0472	0.0007	0.0258	0.0004	0.0040	0.0000	25.8	0.4	25.4	0.2
CS16123-2 27	673	18057	0.04	0.0488	0.0009	0.0254	0.0004	0.0038	0.0000	25.5	0.4	24.3	0.2
CS16123-2 28	833	20232	0.04	0.0481	0.0011	0.0252	0.0005	0.0038	0.0000	25.3	0.5	24.4	0.3
CS16123-2 29	309	4626	0.07	0.0463	0.0013	0.0253	0.0007	0.0040	0.0000	25.4	0.7	25.5	0.3
CS16123-2 30	1030	28539	0.04	0.0477	0.0007	0.0257	0.0004	0.0039	0.0000	25.8	0.3	25.1	0.2
CS2006													
CS2006 01	341	1680	0.20	0.0475	0.0013	0.0197	0.0005	0.0030	0.0000	19.8	0.5	19.4	0.2
CS2006 02	306	1860	0.16	0.0477	0.0015	0.0195	0.0006	0.0030	0.0000	19.6	0.6	19.2	0.2
CS2006 03	746	3219	0.23	0.0468	0.0010	0.0191	0.0004	0.0030	0.0000	19.2	0.4	19.1	0.2
CS2006 05	359	2099	0.17	0.0454	0.0012	0.0192	0.0005	0.0031	0.0000	19.3	0.5	19.7	0.2
CS2006 06	331	4338	0.08	0.0474	0.0010	0.0202	0.0005	0.0031	0.0000	20.3	0.5	19.8	0.2
CS2006 07	271	1276	0.21	0.0484	0.0015	0.0197	0.0006	0.0030	0.0000	19.8	0.6	19	0.2
CS2006 08	391	2005	0.20	0.0461	0.0007	0.0193	0.0002	0.0030	0.0000	19.4	0.2	19.6	0.2
CS2006 09	694	3422	0.20	0.0461	0.0017	0.0184	0.0007	0.0029	0.0000	18.5	0.7	18.7	0.2
CS2006 10	251	1283	0.20	0.0468	0.0014	0.0196	0.0006	0.0030	0.0000	19.7	0.6	19.5	0.2
CS2006 11	611	2623	0.23	0.0492	0.0012	0.0203	0.0005	0.0030	0.0000	20.4	0.5	19.3	0.2
CS2006 12	742	3156	0.24	0.0461	0.0007	0.0186	0.0003	0.0029	0.0000	18.8	0.2	18.9	0.2
CS2006 13	595	2802	0.21	0.0483	0.0011	0.0199	0.0005	0.0030	0.0000	20	0.5	19.3	0.2
CS2006 14	730	3337	0.22	0.0462	0.0018	0.0187	0.0007	0.0029	0.0000	18.8	0.7	18.9	0.2
CS2006 15	574	3080	0.19	0.0487	0.0014	0.0208	0.0006	0.0031	0.0000	20.9	0.6	19.9	0.2
CS2006 16	952	5510	0.17	0.0494	0.0010	0.0209	0.0004	0.0031	0.0000	21	0.4	19.7	0.2
CS2006 17	249	1973	0.13	0.0461	0.0012	0.0192	0.0005	0.0030	0.0000	19.3	0.5	19.4	0.2
CS2006 18	548	3040	0.18	0.0461	0.0014	0.0186	0.0005	0.0029	0.0000	18.7	0.5	18.8	0.2
CS2006 20	514	2379	0.22	0.0461	0.0009	0.0183	0.0003	0.0029	0.0000	18.4	0.3	18.6	0.2
CS2006 21	821	3377	0.24	0.0462	0.0011	0.0189	0.0004	0.0030	0.0000	19	0.4	19.1	0.2
CS2006 22	562	3567	0.16	0.0492	0.0011	0.0207	0.0005	0.0031	0.0000	20.8	0.5	19.7	0.2
CS2006 23	200	1868	0.11	0.0472	0.0014	0.0198	0.0006	0.0031	0.0000	19.9	0.5	19.7	0.2
CS2006 24	945	3791	0.25	0.0468	0.0013	0.0193	0.0005	0.0030	0.0000	19.4	0.5	19.3	0.2