Supplemental Items for

Continuous Be mineralization from two-mica granite to pegmatite: Critical element enrichment process in a Himalayan leucogranite pluton

CHEN LIU[1, 2], RU-CHENG WANG[1, 2]*, ROBERT L. LINNEN[3], FU-YUAN WU[4], LEI XIE[1, 2], XIAO-CHI LIU[4]

[1]*State Key Laboratory for Mineral Deposits Research, School of Earth Sciences and Engineering, Nanjing University, Nanjing 210023, China*

[2]*Frontiers Science Center for Critical Earth Material Cycling, Nanjing University, Nanjing 210023, China*

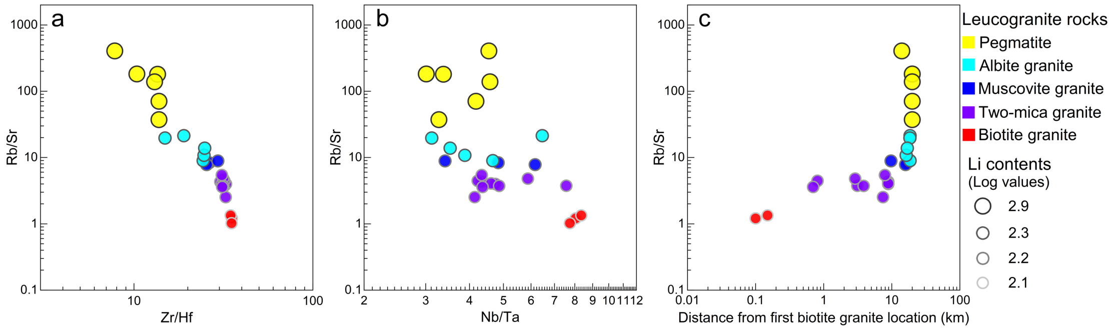
[3]*Department of Earth Sciences, Western University, 1151 Richmond St, London, Ontario N6A 3K7, Canada*

[4]*State Key Laboratory of Lithospheric Evolution, and Institutions of Earth Science, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China*

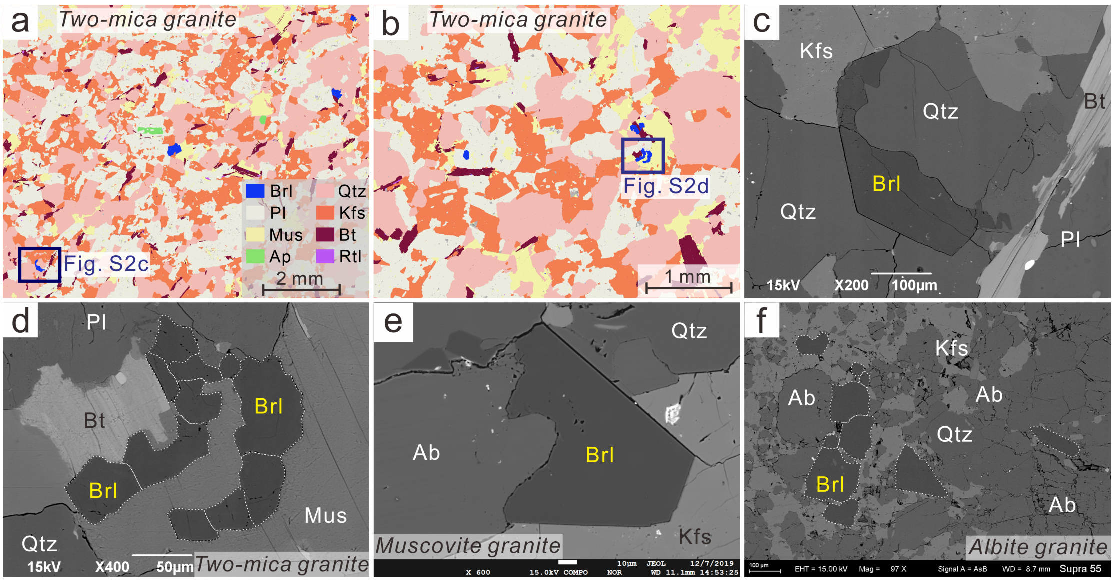
**Corresponding author: Rucheng Wang (rcwang@nju.edu.cn)*

Contents

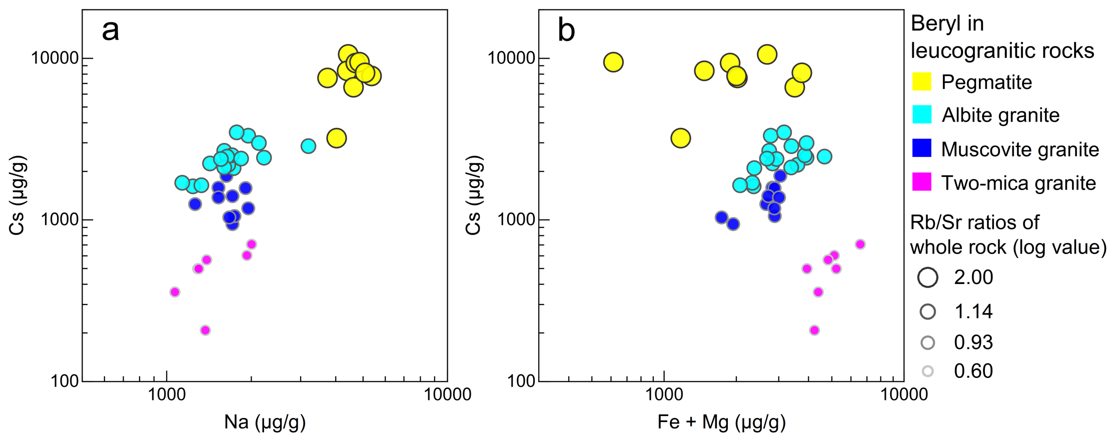
Item S1: Supplemental Figures



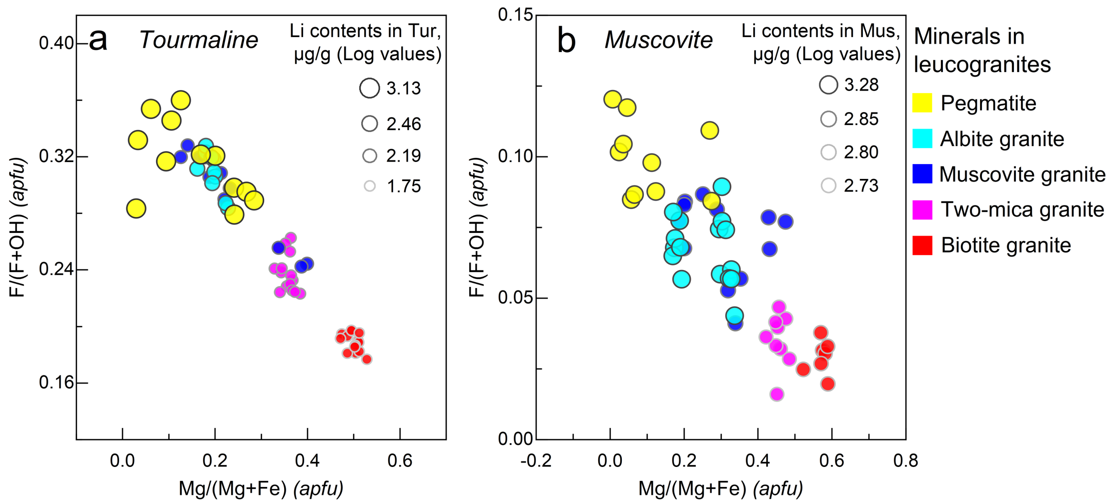
Supplemental Figure S1. Co-variation of whole-rock trace elements in the Pusila leucogranites. **(a)** Rb/Sr versus Zr/Hf. **(b)** Rb/Sr versus Nb/Ta. **(c)** Rb/Sr versus distance from the first biotite granite sampling point.



Supplemental Figure S2. Occurrence of beryl. **(a–d)** Small beryl crystals in two-mica granite (**a, b** EDS maps; **c, d** BSE images). **(e)** Subhedral beryl crystals interstitial to rock-forming minerals in muscovite granite (BSE image). **(f)** Euhedral or subhedral beryl crystals in albite granite (BSE image). Abbreviations: Brl = beryl; Kfs = K-feldspar; Pl = plagioclase; Ab = albite; Qtz = quartz; Mus = muscovite; Bt = biotite.



Supplemental Figure S3. Composition of beryl. **(a)** Covariance Cs (µg/g) versus Na (µg/g). **(b)** Covariance Cs (µg/g) versus Fe + Mg (µg/g).



Supplemental Figure S4. Composition of tourmaline and muscovite. **(a)** Covariance F/(F+OH) (apfu) versus Mg/(Mg+Fe) (apfu) in compositions of tourmaline. **(b)** Covariance F/(F+OH) (apfu) versus Mg/(Mg+Fe) (apfu) in compositions of muscovite.

Item S3: Additional Information on Partial Melting

Two non-modal equations were considered as approximate to geologically reasonable conditions for modeling partial melting (Harris and Inger 1992):

Firstly batch melting equation: $C_l/C_o = 1/[(D_o–PF)+F]$,

Secondly fractional melting equation: $C_l/C_o = (1/F)\ [1–(1–PF/D_o)^{1/P}]$.

D_o: Bulk distribution coefficient of a given trace element at the onset of melting;

C_o: Weight concentration of a trace element in the original unmelted solid (units: µg/g);

C_l: Weight concentration of a trace element in melt (units: µg/g);

P: Bulk distribution coefficient of minerals which make up a melt;

F: Weight fraction of melt relative to original parent (0-1).

$D_0i = x_1 Kd_1 + x_2 Kd_2 + x_3 Kd_3 + ...$

Where D_{0i} is the bulk partition coefficient for element i, and x_1 and Kd_1 etc. are the percentage proportion of mineral 1 in the rock and the Nernst partition coefficient for element i in mineral 1, respectively.

$Pi = p_1 Kd_1 + p_2 Kd_2 + p_3 Kd_3 + ...$

Where Pi etc. is the normative weight fraction of mineral 1 in the melt and Kd_1 is the mineral-melt distribution coefficient for element i for mineral 1.

Reference

Harris, N. and Inger, S. (1992) Trace element modelling of pelite-derived granites. Contributions to Mineralogy and Petrology, 110, 46–56, https://doi.org/10.1007/BF00310881.