

Supplementary Materials

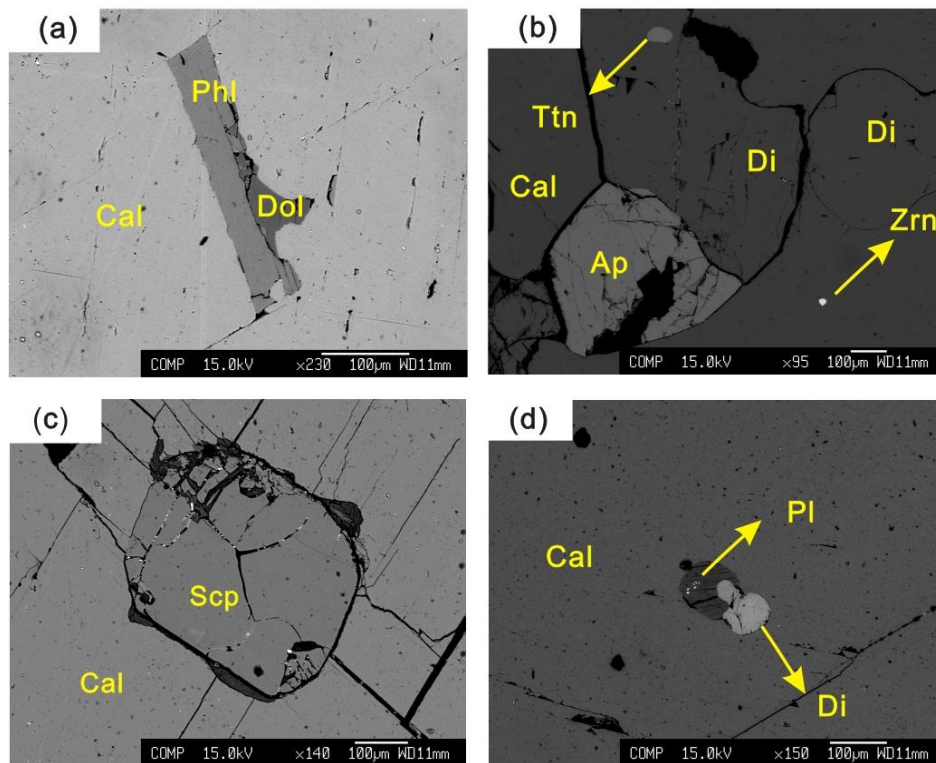


Figure S1. Backscattered electron images showing accessory minerals in the ruby-bearing marbles. (a) Phlogopite and dolomite in the marble. (b) Diopside, apatite, titanite and zircon in the marble. (c) Scapolite in the marble. (d) Small plagioclase coexisting with diopside in the marble. Mineral abbreviations [1]: Ap: apatite; Cal: calcite; Di: diopside; Dol: dolomite; Phl: phlogopite; Pl: plagioclase; Scp: scapolite; Ttn: titanite; Zrn: zircon.

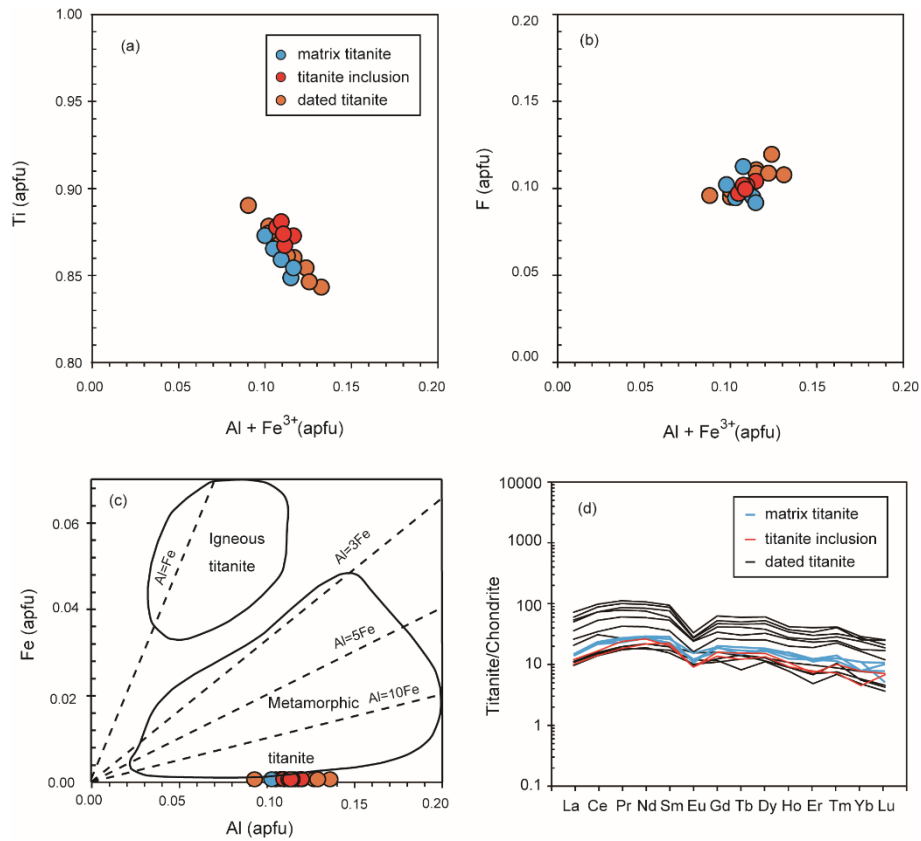


Figure S2. Mineral chemical features of the studied titanite samples. **(a)** Correlation between (Al + Fe³⁺) and Ti (per formula unit) in the studied titanite samples. **(b)** Correlation between (Al + Fe³⁺) and F (per formula unit) in the studied titanite samples. **(c)** Plot of Al versus Fe cations per formula unit for titanite. Diagram modified from Aleinikoff et al. [2] and Rasmussen et al. [3]. **(d)** Chondrite-normalized REE pattern for titanite. (Chondrite REE values from [4])

References

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3. Rasmussen, B.; Fletcher, I.R.; Muhling, J.R. Dating deposition and low-grade metamorphism by in situ U–Pb geochronology of titanite in the Paleoproterozoic Timeball Hill Formation, southern Africa. *Chem Geol.* **2013**, *351*, 29–39.
4. McDonougha, W.F.; Sun, S.S. The composition of the Earth. *Chem. Geol.* **1995**, *120*, 223–253.