

HIGHLIGHTS AND BREAKTHROUGHS

Small grains and big implications: Accessory Ti- and Zr-minerals as petrogenetic indicators in HP and UHP marbles

PETER TROPPER^{1,*}

¹Institute of Mineralogy and Petrography, University of Innsbruck, A-6020 Innsbruck, Austria

Abstract: The paper by Proyer et al. (2014; this issue) demonstrates that Ti- and Zr-bearing accessory minerals (rutile, titanite, zircon) record through their reaction textures part of the metamorphic history of a UHP marble. Calculation of relevant petrogenetic grids has the power to constrain the retrograde *P-T* path based on phase stability fields and the geothermobarometric evaluation of H₂O-independent mineral reactions involving these Ti- and Zr-bearing minerals. They calculated simple petrogenetic grids in the system TiO₂-ZrO₂-CaO-MgO-Al₂O₃-SiO₂-CO₂-H₂O (TZCMASCH) for calcite-dolomite marbles with forsterite/antigorite in excess and including those Ti- and Zr-bearing minerals for which thermodynamic data are known (rutile, titanite, geikielite, zircon, baddeleyite) and delineated their stability fields as well as the succession of their stability regions. This approach allowed the authors to infer the shape of the retrograde *P-T* path. Thus the combination of very careful petrography, calculated simple petrogenetic grids and the application of geothermometry involving these Ti- and Zr-bearing accessory minerals becomes an indispensable tool when reconstructing a metamorphic rock's evolution. **Keywords:** Rutile, titanite, zircon, UHP, petrogenetic grid, Rhodope Mountains

* E-mail: Peter.Tropper@uibk.ac.at