

Sr-bearing zoisite and epidote in ultra-high pressure (UHP) metamorphic rocks from the Su-Lu province, eastern China: An important Sr reservoir under UHP conditions

AKIKO NAGASAKI AND MASAKI ENAMI

Department of Earth and Planetary Sciences, Graduate School of Science, Nagoya University, Nagoya 464-01, Japan

ABSTRACT

Sr-bearing zoisite and epidote are common constituents of eclogites and associated par-schists throughout the Su-Lu ultra-high pressure (UHP) province, eastern China. The SrO content of prograde zoisite and epidote reaches 3.2 wt% in crystal cores and generally decreases toward crystal margins. Retrograde epidote is poorer in SrO (<0.1 wt%). Preliminary rare earth element (REE) analyses of epidote give La₂O₃ (up to 2.9 wt%), Ce₂O₃ (5.9 wt%), and Nd₂O₃ (3.0 wt%). REE contents of zoisite are distinctly lower (La₂O₃ up to 0.16 wt%, Ce₂O₃ up to 0.26 wt%, and Nd₂O₃ up to 0.16 wt%) than coexisting epidote. Apatite is always more depleted in SrO (0.10–0.59 wt% on average) than coexisting zoisite and epidote, and Sr-Ca partition coefficients for zoisite and epidote and apatite [(Sr/Ca)_{zo/ep-ap}] range from 5 to 20. SrO content of K-white mica (0.012–0.044 wt%) is an order of magnitude lower than that of apatite. An evaluation of the SrO content in zoisite and epidote and their modal abundances in seven samples indicates that >70% of the whole-rock SrO is contained in these minerals. Apatite and K-white mica are only minor reservoirs for SrO in these rocks. Zoisite and epidote are thus regarded as the most important Sr reservoirs at UHP conditions where calcic plagioclase and titanite are unstable.