

XIONG Fahui, YANG Jingsui, Paul T. ROBINSON, Yildirim DILEK, CHEN Yanhong, XU Xiangzhen, LIU Zhao, TIAN Yazhou, ZHOU Wenda, LAI Shengming and ZHANG Lan, 2015. Diopside and Magnetite Exsolutions in Olivine from Lower Cr[#] Dunite in the Dongbo Ophiolite, Southern Tibet. *Acta Geologica Sinica* (English Edition), 89(supp. 2): 101.

Diopside and Magnetite Exsolutions in Olivine from Lower Cr[#] Dunite in the Dongbo Ophiolite, Southern Tibet

XIONG Fahui^{1,*}, YANG Jingsui¹, Robinson T PAUL¹, Dilek YILDIRIM^{1,2}, CHEN Yanhong¹, XU Xiangzhen¹, LIU Zhao³, TIAN Yazhou¹, ZHOU Wenda⁴, LAI Shengming⁵ and ZHANG Lan⁵

ICARMA, State Key Laboratory for Continental Tectonics and Dynamics, Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China

2 Department of Geology and Environmental Earth Science, Miami University, Oxford, OH 45056, USA

3 Institute of Mineral Resources, Chinese Academy of Geological Sciences, Beijing 100037, China

4 Faculty of Earth Sciences, China University of Geoscience, Wuhan 430074, China

5 School of Earth Science and Mineral Resources, China University of Geosciences, Beijing 100083, China

Diopside and magnetite exsolutions occur as oriented intergrowths within olivine of the lower Cr[#] dunite in the Dongbo ophiolite, Tibet. The fresh lower Cr[#] dunite has a mineral assemblage of olivine, spinel and diopside. The Fo content of its olivine is 90–92, which is lower than that of the higher Cr[#] dunite lenses (F₀₉₂-F₀₉₄) without exsolutions. The equilibrium crystalline temperature for olivine and exsolved magnetite is 750°C–816°C, indicating that exsolution formation occurred at low temperatures at a late stage. Reaction of melt, containing Ti, Al and Ca, with a previously depleted mantle harzburgite produced an olivine solid solution added with Ti⁴⁺, Al³⁺, Ca²⁺, Fe³⁺. These exsolution textures in olivine and compositional zoning in chromite grains were well preserved as a result of fast cooling or rapid tectonic emplacement of the upper mantle peridotites. Based on the metasomatism with high-Al melt, the Cr[#] of spinel very lower about 12–13, indicate <5% partial melting in exsolutions dunite. However, the higher Cr[#] dunite (~73–80) without exsolutions have highly partial melting (>40%), show reaction with boninitic melt. Therefore, we suggest that the Dongbo ophiolite have multi - stage

process. UHP minerals are trapped in these magnesiochromite grains. When oceanic crustal slabs are trapped in Mid Ocean Ridge, they are modified by tholeiitic magmas, which occur interaction or metasomatism, then later reaction with boninitic magma in suprasubduction zones (SSZ).

Acknowledgements

We thank the State Key Laboratory for Continental Tectonics and Dynamics, Institute of Geology, Chinese Academy of Geological Sciences, China and the China National Research Center for the geochemical analyses. This research was funded by grants from Sinoprobe-05-02 from the Ministry of Science and Technology of China, the NSF China (Nos. 40930313, 40921001, 41202036), the China Geological Survey (Nos. 1212011121263, 12120114061801, 2014DFR2127C), and project from Institute of Geology, Chinese Academy of Geological Sciences (J1526).

* Corresponding author. E-mail: xiongfahui@126.com