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Petrogenesis Implications of Zoned Spinel from Northeastern Jiangxi Province Ophiolite (NEJXO), China

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Spinel is a very important rock-forming mineral in peridotites, and can be used as a sensitive indicator of petrologic processes that occur in its host rock [1]. This study focus on zonal spinel in serpentines from Northeastern Jiangxi Province ophiolite (NEJXO), China. The northeastern Jiangxi Province ophiolite is located in SE margin of the Yangtze Block, and the original sequence of ophiolite has been structurally disrupted. NEJXO often represents a relic of the Huanan ocean between Yangtze and Cathaysia blocks [2]. Most of the dismembered peridotites of NEJXO are highly serpentized, requiring care in applying geochemistry to distinguish their tectonic setting.

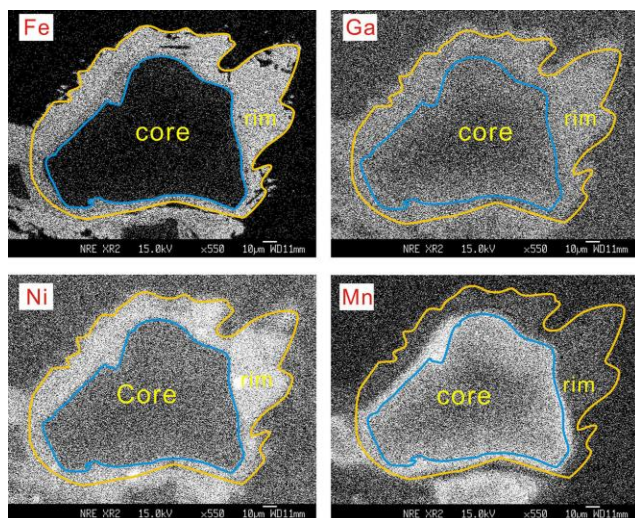


Figure 1: Elements mapping of spinel from NEJXO

The structure and composition of those zonal spinels from NEJXO are responsive to changing conditions of regional geological processes. Those zonal spinel from NEJXO show granular structure with Cr# value between 45.36 to 49.53 wt.%, and FeO^T, Ga, Co, Ni and Ti increasing from core to rim, whereas Cr and Mn decrease (Figure 1). The ferric iron of zonal spinel calculated using the charge balance equation shows that the rim has much higher ferric iron ratio than the core, which suggests the environmental oxygen fugacity has increased from core to rim [3]. Those characteristics indicate that the zonal spinel may form during a subduction metasomatic process, and re-ordering of trace element from core to rim. During the subduction process, oxidizing fluids infiltrated the pores in the

spinel, and re-ordering of Fe²⁺ and Fe³⁺ into octahedral and tetrahedral sites, which promoted Ga, Co, Mn, Ni and Ti redistributed between tetrahedral and octahedral sites. It suggest that fluid played an important role in the formation of zonal spinel, in addition the source of fluid in the mantle peridotite is closely related to the tectonic environment. Therefore, the zonal spinel has recorded the geodynamic environmenta evolution of the Northeastern Jiangxi Province ophiolite.

Acknowledgements

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References:

[1] Dick HJB and Bullen T (1984) CMP 86:54-76

[2] Li XH et al. (1997) PR, 81(1-2):129-144

[3] Dare SAS et al. (2009) CG 261(1-2):199-216

