

Mineral compositions along ridge segment and highly refractory zones in the mantle section of Fizh block, northern Oman ophiolite

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We studied the mantle section of the Fizh block in the northern Oman ophiolite to investigate a relation of mineral compositions with segment structure of paleo-ridge and to identify highly refractory harzburgite zone associated with high temperature shear zones in the southern part of the Fizh block.

Recently, Miyashita and Adachi (2003), Le Mee et al. (2004) and Monnier et al. (2006) reported an inferred center and an end of a paleo ridge segment in the Fizh block from the northern Oman ophiolite. Moreover, Kanke and Takazawa (2006) reported a NW-SE trending highly-refractory harzburgite zone in the northern part of the Fizh block.

In this study we analyzed planar and linear structures and mineral compositions for 68 harzburgites. Spinel Cr# ($=Cr*100/(Cr+Al)$ molar ratio) more than 60 and olivines Fo greater than 91.5 always occur along shear zones. Particularly, high Cr# spinel were found near the shear zone in the Wadi Bani Umar.

The maximum number of Spinel Cr# increases from the south toward the north in the Fizh block. In the south the range of spinel Cr# is most limited in a range from 55.6 to 63.2 while, in the Rajmi area in the northern Fizh block, spinels Cr# ranges from 24.2 to 77.6 (Kanke and Takazawa, 2006). These results indicate that the range of spinel Cr# increases from the south where a segment center for a paleo ridge was located toward the north, the segment end.

The ubiquitous presence of spinel with high Cr# greater than 60 along shear zones in the southern part of the Fizh block is consistent with a model that a oceanic lithospheric mantle remelted due to fluid migration along shear zone during oceanic thrusting event (Kanke and Takazawa, 2006). Because the maximum number of spinel Cr# in the south is lower than in the north the amount of remelting in the south is lower than in the north. Finally, we conclude that highly refractory zone commonly occur along shear zone in the southern part of the Fizh block although the degree and volume of remelting was significantly large in the segment end more than in the center.