



## **Petrography and mineralogy study of the ultramafic rocks in Separou peridotites, Nain Ophiolite, Central Iran**

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The Nain ophiolite comprise of mantle and crustal sequences. The mantle sequence consist of lherzolite, harzburgite which mark mantle deformation, cut across by plagioclase-bearing harzburgite, wherlite and pyroxenite dikes and dunitic pods. The isolated diabasic dike cut all of the mantle sequence. The plutonic part of crustal sequence contain isotropic gabbro, diabase sheeted dike complex and pegmatite gabbro. The extrusive sequence comprise of pillow lavas and sheet flows, radiolarite, chert and pelagic limestone which have Upper Cretaceous microfossils.

Base of the microscopic studies, most of harzburgite have granoblastic and porphyroclastic textures which confirm their mantle deformation. Olivine is partly serpentinized, chrysotile and lizardite and clinopyroxene is fresh but locally altered to tremolite-actinolite, chlorite and talc.

The microprobe analysis of minerals indicate that the olivines mostly have forsterite composition ( $\text{Fo}_{93.76}\text{Fa}_{6.23}$ ). The orthopyroxene have enstatite ( $\text{En}_{89.9}\text{Fs}_{8.4}\text{Wo}_{1.56}$ ), bear exsolution lamellas of clinopyroxene with diopside composition ( $\text{En}_{48.3}\text{Fs}_{3.7}\text{Wo}_{47.9}$ ). The Cr-spinel formed as subhedral to euhedral. The plagioclase-bearing harzburgitic dikes have cumulate texture, and consist of olivine with forsterite composition ( $\text{Fo}_{94}\text{Fa}_6$ ), orthopyroxene with enstatite composition ( $\text{En}_{86.43}\text{Fs}_{10.5}\text{Wo}_{3.06}$ ). The plagioclase have anorthite composition ( $\text{AN}=90$ ). Dunite have granular to granoblastic texture and mostly composed of olivine with forsterite composition ( $\text{Fo}_{92.15}\text{Fa}_{7.33}$ ).

Pyroxenites have granular texture, and consist of orthopyroxene, clinopyroxene and very low serpentinized olivine. The clinopyroxene have diopside composition from

( $\text{En}_{50.6}\text{Fs}_{7.2}\text{Wo}_{42.1}$ ) to ( $\text{En}_{52.7}\text{Fs}_{6.2}\text{Wo}_{41.41}$ ) and orthopyroxene have enstatite composition from ( $\text{En}_{86.3}\text{Fs}_{10.6}\text{Wo}_{2.9}$ ) to ( $\text{En}_{89.05}\text{Fs}_{7.9}\text{Wo}_{2.9}$ ).

The chondrite-normalized spider diagram of harzburgite show a depleted source for Separou peridotite but the cross cutting peridotite with cumulative character are moderately enriched.