IRANIAN SOCIETY of CRYSTALLOGRAPHY and MINERALOGY

Vol. 20, No. 2, Summer 1391/2012

IRANIAN JOURNAL of CRYSTALLOGRAPHY and MINERALOGY

Petrology of peridotites and volcanic rocks of Surk ophiolitic mélange (Yazd province)

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(Received: 4/3/2011, in revised form: 12/7/2011)

Abstract: The Surk ophiolitic mélange is located at the south west of central Iran and along the Naein-Dehshir-Baft ophiolitic belt. In petrological sequence, peridotites are nominated the undermost part of rock unit, and then gabbros and volcanic rocks are at the following ranks respectively. The predominant peridotitet of this ophiolitic mélange is harzburgite. Lherzolite that is the primitive mantle rock consists of olivine, orthopyroxene, clinopyroxene as major minerals and chromian spinel and amphibole (pargasite) as accessory mineral. Petrographical characteristics and mineral chemistry of these peridotites show the lithology evaluation from lherzolite to harzburgite and dunite ultimately. The average SiO_2 and Na_2O content of volcanic rocks in the ophiolitic melange are 70 and 5 weight percent respectively. Petrographical investigations and also classification of these volcanics based on major and trace elements and norm calculations show that these rocks are dacite. REE/chondrite normalized diagrams of these volcanic rocks show horizontal to positively sloping patterns, LREEs are lower than HREEs and their La/Yb ratio is lesser than 1; suggest tholeitic nature of their parent magma. Moreover, Hf/Zr, U and Pb contant of these rocks is higher than the content in the Primitive mantle but the Sr, Ti and Y contant is lower. These differences can be caused by melt migration of subducted oceanic lithosphere on mantle peridotites. By melt/rock reactions clinopyroxene dissolution, incongruent melting of orthopyroxene, formation of replacive olivines and SiO_2 increasing in ascending melt will occur. All these characteristics propose that the Surk ophiolitic mélange is a Harzburgite Ophiolitic Type (HOT) which is formed at the supra-subduction (back-arc basin) zone.

Keywords: *Mantle peridotite; Volcanic rocks of ophiolitic mélange; melt/subducted lithospheric mantle reaction; immobile elements; Back arc basin; Surk.*

متن فارسی اصل مقاله از صفحه ۲۹۳ تا ۳۰۶ در این شماره به چاپ رسیده است.

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