IRANIAN SOCIETY of CRYSTALLOGRAPHY and MINERALOGY

Vol. 24, No. 3, Fall 1395/2016

IRANIAN JOURNAL of CRYSTALLOGRAPHY and MINERALOGY

Textural and Sr-Nd isotopic evidence of assimilation of pelitic rocks in the Alvand plutonic complex (western Iran)

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(Received: 23/8/2015, in revised form: 10/1/2016)

Abstract: A wide range of plutonic rocks, ranging from mafic to felsic compositions, including various gabbros, diorites, tonalites, granodiorites, monzogranites, syenogranites and leucocratic granitoids, occur in the Alvand plutonic complex, Sanandaj-Sirjan zone, Iran. Age of this complex is middle Jurassic. In this complex, granitic and dioritic rocks occur as major constituents. Granites contain plagioclase, K-feldspar, quartz and bitite and diorites comprise plagioclase, hornblende, biotite and minor titanite and apatite. In some outcrops, contaminated granites and diorites occur which contain abundant large undigested xenocrysts of andalusite (partly to wholly converted to sillimanite) with spinel-rich and feldspathic reaction rims around them. These xenocrysts resulted from disintegration of minerals from pelitic rocks and their incorporation into host magmas. The 87Sr/86Sr isotope ratios in the studied granitic rocks vary from 0.7101 to 0.7245 and in the contaminated diorites from 0.7084 to 0.7079 (Sri more than 0.704). The range of 143Nd/144Nd ratios in granitic rocks is from 0.51234 to 0.51240 and for contaminated diorites from 0.51244 to 0.51252.The εNd(t) values for the studied granites vary from -3.2 to -3.98 and for contaminated dioritic rocks from -0.78 to -2.35. In the 143Nd/144Nd versus 87Sr/86Sr diagram, granites plot in the field of crustal rocks; also diorites with mantle origin, in response to contamination by meta-pelitic rocks, are shifted towards rocks with crustal origin. These results indicate the importance of recognizing contamination of plutonic rocks by upper crustal (meta-pelitic) material when interpreting petrogenesis of such rocks.

Keywords: *Alvand pluton; assimilation; contamination; diorite; granite; Sanandaj-Sirjan*

متن فارسی اصل مقاله از صفحه ۵۰۳ تا ۵۱۴ در این شماره به چاپ رسیده است.

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