Comparison of the geochemistry of source rocks at Tannurjeh Au-bearing magnetite & Sangan Au-free magnetite deposits, Khorasan Razavi, Iran

M. H. Karimpour, A. Malekzadeh

Geology department of Ferdowsi University of Mashhad
E-mail: mhkarimpour@yahoo.com

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Abstract: Both Sangan and Tannurjeh magnetite deposits are Iron-oxides type. Geochemistry and petrography of source rocks at Tannurjeh and Sangan were studied in detail. The source rocks at Sangan are composed of quartz hornblende alkali syenite porphyry and quartz biotite-hornblende alkali syenite porphyry; while The source rocks at Tannurjeh varies between hornblende quartz diorite porphyry and hornblende granodiorite porphyry. The Au content of Sangan deposit is up to 32 ppb, while Tannurjeh contains up to 700 ppb Au. Based on major oxides analyses, the source rocks at Sangan is ultra-potassic (K$_2$O is 8.5 to 13%), but in Tannurjeh the K$_2$O is lower than 3.5%. The MgO, TFeO, and CaO content of Tannurjeh source rocks is higher, therefore the rocks are slightly mafic in comparison with Sangan source rocks. The content of HFSE elements such as Cu, Ni, Co, Cr, V are higher in Sangan source rocks and the LILE elements such as Th, Zr, Ba, Rb are higher in Tannurjeh source rocks. The La and Ce content of Tannurjeh is higher. At Tannurjeh the Sr and Zn content is higher while at Sangan Nb and Y is higher. The source rocks for IOCG deposits in Chile, coastal belt of Peru, and kirona area in Sweden are high to medium K-content, and alkaline to calc-alkaline diorite-monzonite-granodiorite; therefore the source rocks at tannurjeh have very high similarity in composition to these rocks.

Keywords: Sangan, Tannurjeh, Source rocks, Iron-oxide deposit, Au.