Comparative rates of weathering on ilmenite in titanium deposit from Kahnuj, South of Iran

M. SAADATI[1,2], M.A. RAJABZADEH[2], AND Y. FEDORTCHOUK[1]

1. Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia, B3H 4R2, Canada

2. Department of Earth Sciences, Shiraz University, Shiraz, 7146713565, Iran <Monir@dal.ca>

The titanium resources in Iran can be classified as mafic intrusions and placer deposits. Kahnuj deposit is located in Kahnuj ophiolite, 330 km south of Kerman, Iran. The deposit is the largest titanium deposit in Iran which presents in gabbroic rocks of the Kahnuj ophiolite (Late Cretaceous.) and alluvial placer ores of Darreh-Gaz valley (Quaternary). The ophiolite became a source of fragmental material for the ilmenite placer formation and was weathered and being transported by river streams accumulated as a cone of dejection in the valley. The placer deposit occurs in high level terrace deposits (Q^{tla}) and recent stream sediments (Q^{t2}). The purpose of this work is to investigate the ilmenite changes in the placer deposit and compare their properties with that ilmenite from the source rocks during weathering. The ilmenite concentrate of the fresh and weathered source rock (ferrogabbros and ilmenite gabbros) and the sediment samples (Q^{tla} and Q^{t2}) were studied for the purpose. An investigation of textural relations of the ilmenite in the Kahnuj deposit was carried out in conjunction with quantitative mineralogical studies like XRD, SEM-EDX and TGA and magnetic susceptibility measurements. Ore microscopic investigation reveals that intensity and mode of alteration in the ilmenite grains was different in our samples. The shape of ilmenite grains ranges from prismatic-subhedral to anhedral and irregular depending on the distance from the bedrock source and energy in the depositional environment. The degree of weathering of the detrital ilmenite in the study area affected the grain size, surfaces morphology, magnetic and thermal properties. The progressive weathering of the detrital ilmenite leads to an increasing development of intra-grain fractures and to the extensive replacement of secondary products such as rutile, pseudorutile, and sphene. Despite undergone limited alteration of ilmenite in the parental rock, they differ from the quantitative and qualitative properties of the ilmenite grains that enter sedimentary drainage systems. The Kahnuj deposit is a unique natural laboratory allowing for studying changes in ilmenite properties during fluvial transport.

Atlantic Geology, 2016, Volume 52
Atlantic Geoscience Society Abstracts 42nd Annual Colloquium & General Meeting 2016
doi: 10.4138/atlgeol.2016.004