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Geology and geochemistry of manganese-bearing veins of Beshgaz in NE of Birjand, Southern Khorasan

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Abstract: The Beshgaz manganese-bearing veins are located in ~45 km northeast of Birdjand, South-Khorasan, and east of Iran. These veins with 0.1-1.5 m thickness and 4-7 m length are engulfed discordantly within Paleocene (Eocene-Oligocene) volcanic-pyroclastic rocks. The host of Mn-bearing veins are dacite to rhyo-dacite tuff, lapilli tuff with andesitic and andsi-basaltic fragments in shear zones. The Mn grade reaches up to 45% in the vein/veinlets. The major Mn ore minerals are pyrolusite, cryptomelane, and psilomelane. Ore minerals showing colloform and open-space filling textures. Amorphous silica is the principal gangue mineral in the Mn ores and the SiO₂ content of these veins vary from 2.41 in Mn-bearing veins to 20.98 % in silicic zone. Based on mineralographic and geochemical data, the Mn ores were preliminarily precipitated as amorphous Mn-oxide and hydroxide gels, and gradually psilomelane and then pyrolusite were developed in expense of the primary amorphous minerals. The average ratio of Mn/Fe in Beshgaz manganese-bearing veins is 26.31 and positive correlation of manages with Ba, Sr, U, and Zn in Mn-bearing veins indicate that these veins have formed as epigenetic by hydrothermal fluids.

Keywords: *manganese; Pyrolusite; Psilomelane; Amorphous silica; South-Khorasan.*

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