

Genesis of Afzalabad, Tourshak, and Chah Khoo magnesite deposits (eastern city of Birjand) based on elemental and Oxygen and Carbon isotopic studies

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Iran magnesite deposits are mainly discovered in eastern city of Birjand. Afzalabad, Tourshak Mohammadi, and Chah khoo Magnesite deposits were studied with respect to major, trace elements and C-O isotopes. Magnesite are found mainly within ophiolite. They form as vein and lenses. Magnesite mineralization is associated mainly with Nehbandan and Neh fault systems. Nehbandan fault is very steep and also is very deep.

North Afzalabad magnesite has the highest Na- content 259-1670 ppm and this is the result of flysch found in the footwall. South Afzalabad has the lowest Na-content (Na= 12 to 275 ppm) because there is no flysch type rocks in the area. Huntite has the highest Na-content ranging from 3046 to 3486 ppm. The lowest Sr found in South Afzalabad (2-8 ppm) and Chah Khoo (0-50 ppm). The highest Sr (35-211) found in Turshak Mohammadi and North-Afzalabad deposits. The highest Mn and Fe found at Chah Khoo and North Afzalabad deposits and the lowest Mn and Fe is associated within Tourshak and south Afzalabad deposits. Huntite has the highest Mn and Fe content.

C-O isotopic composition of magnesite from Tourshak, Afzalabad and Chah Khoo were compared with magnesite deposits associated within Alpine ophiolite belt discovered in Turkish, Greek, Yugoslavia, Austria, and California. The C-O isotopic composition of Alpine ophiolite are $\delta^{18}\text{O}_{(\text{SMOW})} = 23-27$, and $\delta^{13}\text{C}_{(\text{PDB})} = -17$ to -6 and all of them plot in the same region, but Afzalabad, Tourshak and Chah Khoo plot indifferent field. The $\delta^{18}\text{O}\%$ values of magnesite deposits in eastern Iran ranging from 31-36 (‰ SMOW) and $\delta^{13}\text{C}$ ranges is between 1.8 – 8 (‰ PDB). The CO_2 had atmospheric origin and the H_2O was meteoric.