Boron contamination in the groundwater of Chahar-Farsakh area, South Khorasan, Iran

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Groundwaters from 6 qanat and spring stations within the Chahar-Farsakh area, north-west of Nehbandan, South Khorasan province, Iran were sampled for metal contamination analysis. The data were used to calculate metal index (MI), all of the groundwater samples show metal index higher than 1. Among all analysis results, boron show high concentration in the groundwater samples. Concentrations of B in water samples from Chahar-Farsakh area were determined to range between 1.043-4.811 ppm, exceeding WHO (2009) limits (0.5 mg/L) for drinking waters. Naturally occurring boron is present in groundwater primarily as a result of leaching from rocks and soils containing borates and borosilicate. Geological surveying in the study area revealed some outcrops of pegmatite aplitic veins with tourmaline mineralization. Probably existence of tourmaline is the major natural source of boron in the water samples of Chahar-Farsakh area.

Petrography and mineralogy of Western Samen Metapelites

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The study area is located in southern of Hamadan, Sanandaj-Sirjan zone. Metamorphic rocks involve philite and Schist with green schist facies, advanced to amphibolite facies. These rocks composed of various metamorphic minerals. EPMA analysis is applied on some mineral to recognition of chemical composition of rock forming minerals. Mineral chemistry shows Muscovites that formed in rim of andalusite, have higher grade than those are in matrix and resulted of progressive metamorphism of andalusite to Muscovite, Staurolite and Fibrolite. Also Biotites are ferric and garnet is almandine and belongs to Piralespite groupe. Zoning pattern in garnet imply two progressive metamorphism and a retrogressive metamorphism that preserved in some garnets. Analytical data only show the composition of Staurolite.