Geology, mineralogy and chemistry of apatite-magnetite mineralization in Se-Chahoun hydrothermal alteration rocks related to Kiruna-type magnetite-apatite ore deposits, Bafq area, Central Iran

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The Central Iranian interior plateau is a triangular-shaped region bounded by the Makran and Zagros Ranges in the south and southwest, the Alborz and Kopeh-Dagh Ranges in the north and northwest, and the East Iran Ranges in the east (Taghipour et al. 2010). More than 34 magnetite-apatite anomalies formed in this area. The Se-Chahoun magnetite-apatite ore deposit located in the Central Iran. It is consist of both X and XI anomalies. The Se-Chahoun kiruna type magnetite-apatite deposits occur between volcanic, volcanoclastic, granite, diorite and doleritic-diabase of the Early Cambrian. Massive magnetite is the most ore mineral in this mine. It is bonded by the hematite and local pyrite. Phosphate mineralization has been distinguished within Fe zones. Ferric-Calcic alteration is the most prominent alteration in this mine. This is identified by the actinolite, magnetite, hematite as well as, chlorite. This alteration followed by the calcic and late silicification. Under BSE imaging apatite has dark and bright areas, bright areas are enriched in LREE (1.46), Cl ((0.3–1.5), Na_2O (0.01–0.4), Si_2O (0.0–0.46) and SO_3 (0.1–0.35), whereas dark areas are depleted in these elements. Not only, widespread Fe-Ca alteration occurred in the host rock, but also REEs moved slowly along the dark and bright areas of apatite. This is caused monazite and xenotime minerals, such as other IOA deposits in the worldwide (Harlov et al., 2002-b).

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2. Harlov, D.E., Andersson, U.B., Förster, H.J., Nyström, J.O., Dulski, P., and Broman, C., 2002b. Apatite-monazite relations in the Kiirunavaara magnetite-apatite ore, northern Sweden. Chem. Geol., 191, 47–72.