Chemical-textural relations of Apatite-monazite-xenotime in the Lakeh-Siah iron-apatite deposit (northeastern Bafq): evidences for a hydrothermal system development

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Abstract: The Lakeh-Siah iron± apatite deposit is located in the Bafq-Saghand Metallogenic Province (Central Iran) and situated within rhyolitic rocks. Magnetite with minor apatite are the main ore minerals in this deposit. Monazite and xenotime minerals in microscopic scale formed as inclusion in the apatite and magnetite crystals and micro-fractures. Based on microscopic and EPMA evidences, apatite is primary mineral and has been scavenging from mafic to ultramafic magma affinities. Apatite crystals are shows irregular zoning from dark and bright phases, then the dark portions mostly enriched in secondary monazite and xenotime inclusions. These results are consistent with the dissolution-reprecipitation process. During this process, apatite crystals reacted with secondary hydrothermal fluids along the crystalline boundaries and have depleted from REE and also due to this process, REEs have been undergone preferential differentiation, LREE and HREE enriched in monazite and xenotime, respectively.

Keywords: Iron oxide± apatite deposits; REE-minerals; metasomatism; dissolution-reprecipitation process.

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