

## **The occurrence of gold in pyrite from the from the Senjedeh gold deposit Muteh mining district**

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Muteh minig, the major gold plant in Iran, is located in the central part of Sanandaj- Sirjan Zone. It consists of two active mine, including the Chah Khatoon and Senjedeh open pits, and several smaller occurrences. Rock units exposing in the area underwent greenschist to lower amphibolite metamorphism. They consist of NW-SE trending deformed and metamorphosed volcano-sedimentary and acidic volcanic rocks. Gold mineralization is hosted in green schist facies metamorphic rocks. Pyrite is the most important Au-hosting mineral in the Muteh minig district; therefore Pyrite from the Senjedeh gold deposit was investigated using a combination of ore microscopy, including back-scattered imaging (BSE), and electron probe microanalysis (EPMA). Based on microscopic and field Based on microscopic and field observations, there are two generations of pyrite, termed as first generation (G1), and second generation (G2). The medium-grained, unhedral and deformed G1 pyrite, coarse grained, euhedral G2 pyrite, contains low- medium level of gold. According to BSE and EPMA mapping, visible gold is widespread and present as irregular grains of native gold mostly along grain boundaries or filling microfractures of pyrite G1 likely resulting from remobilization of invisible gold once locked in the pyrite.

Element mapping indicates that Co is incorporated in pyrite crystal lattice and shows compositional zoning in pyrite grains. Ultramafic, and to a lesser extent mafic rocks, are typically strongly enriched in Co; in contrast, felsic rocks usually contain low Co concentrations. Therefore, high Co concentrations should be a good indicator of a high proportion of mafic to ultramafic over felsic rocks in the fluid source area. Co concentrations of pyrite possibly linked to mafic/ultramafic metamorphic rocks provide further evidence on the orogenic gold deposit affinity.