

# Gold-bearing listvenite in Jabal Al Ghadarah Area Central Arabian Shield, Kingdom of Saudi Arabia

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## Abstract

Jabal Al Ghadarah area is located on the eastern side of the N-S trending Nabitah Suture zone, which is characterized by the occurrence of abundant ophiolitic rocks. The ophiolitic mélanges form a N-S trending belt and consists of imbricated slabs from the ophiolitic rocks and the forearc volcanosedimentary sequence. At Jabal Al Ghadarah, the ultramafic rocks and associated listvenites are mainly exposed (~ 300 m) along a N-S trending thrust fault dipping to the east, in contact with the late Hulayfah sediments. The ultramafic rocks are characterized by the presence of numerous fragments of variable sizes from metagabbros, metabasalts, schists, amphibolites and marbles. According to their chemical and mineralogical compositions, the listvenites are differentiated into magnesite-, dolomite- and calcite- dominated types. The different types consist essentially of varying proportions of magnesite, dolomite, calcite and quartz with minor chromite, magnetite and nickelferrous pyrite and Ni-arsenides. The Ni-sulphides and nickel arsenides are present in noticeable amounts in magnesite and dolomite dominated types. Compared to the serpentinized ultramafic rocks, the listvenites are generally characterized by the addition of CO<sub>2</sub>, K<sub>2</sub>O, CaO, Cu, Zn, As, and Au and leaching of MgO and NiO. Au and As contents show positive correlation and are higher in the magnesite and dolomite dominated types where gold values up to 0.29 g/t and As values up to 1763 ppm were recorded. The widespread carbonatization and silicification observed in the listvenite and their absence in the late Hulayfah volcanosedimentary rocks, which occupy the footwall of the thrust, suggest that the listvenitization processes of the serpentinized ultramafic rocks took place during obduction and prior to thrusting onto late Hulayfah sediments. The results encourage a detailed exploration program for the ultramafic rocks, associated with the different suture zones in Arabian Shield, as a potential target for the occurrence of gold bearing listvenite.