The study of gold bearing Listwaenites in eastern Iran , Birjand ophiolites

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The studied area including Birjand is situated in east of Iran (31,30 to 34 N.Alt , and 59 to 60 E.Longt.) Igneous rocks particularly ophiolitic complexes are quite abondent in the area .No rock unit older than jurassic is seen in the area .

Listwaenites in eastern Iran show a wide range of occurances. On the basis of mineralogy and chemical analysis they could be divided into three main groups as the following :

Carbonatic-List , Silica-List , and Carbonatic-Silica-List .

(I) Carbonatic-List , consist of : Magnesite , Dolomite , Huntite , Siderite , Bronerite and Ankaramite . Which they could be sub-divided into small sub-groups of the Carbonatic-List , Magnesite-List and Huntite-List are the most important ones , which are used for as refractory and color making materials .

(II) Cryptocrystalline Quartz and Opal are the major constituents of Silica-List .

(III) The Silica-Carbonatic-List consist of minerals of both groups (I) and (II) .

Listwaenties of the area are seen as : veins with a width of 1 cm to some hundred meters , and a length of a few centimeters to some kilometers , in sheared zones , with ultramafic and mafic rocks of ophiolitic sole . In some cases Lis are seen as sheets , which are developed sideways , as sometimes Lis forming fluids were stopped on their ways to the surface , where they were oppositted to an impermeable natural barrier . Host-rocks to Lis (with the exception of Neogene Conglomerate) show traces of a week regional metamorphism , which sometimes are developed to Amphibolite facies .No traces of metamorphism are observed in Listwaenites .
Field observations and chemical analysis studies show a high potential of Au , Ag , Cu and PGE contents within the Listwaenties , and also a good positive correlation between the two could be seen .
Since the released fluids pass through different rocks , particularly ultramafic and mafic rocks , they could react with some major and trace elements (e.g. Mg , Fe , Ca , Si , Au , Ag , Cu and PGE) being enriched of them forming complexes , flowing away through primary sheared zones towards the surface .