Au mineralization and its relationship with shear zones in senjedeh gold deposit

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Senjedeh gold deposit is located in middle part of the Sanandaj-Sirjan zone, central Iran. It is consist of several gold deposits such as Chah-katoom, Dareh Ashky and Senjedeh. Lithological and stratigraphic investigations show that the geological units in this area include metamorphic rocks (different facies of greenschist to amphibolite schist), silicified and mineralized veins and granitic intrusions. This series have been deformed in effect of tectonic alternating phases and lost their primary sequence and order during late Cretaceous-Tertiary continental collision between the Afro-Arabian and the Iranian micro continent. As a result of these tectonic activities, different rocks fabric has been formed. Based on structural studies, major tectonic structure in this area is shear zones. According to oriented sample studies, some of the fabric features related to shear zone. Ore-mineral assemblages mainly include pyrite and chalcopyrite. Gold mineralization in Senjedeh area occurred in relation to hydrothermal alterations in metamorphic units during to normal faulting. The pervasive alterations in this area are silicification and sulfidation which are responsible of gold mineralization. The field and petrographic studies show a direct relationship between structures and gold mineralization. The petro fabric studies and correlation mineralization direction show that Senjedeh Gold deposit can be an example of orogenic gold deposit in Iran.

Key words: Senjedeh gold deposit, shear zone, Sanandaj-Sirjan zone

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Structure-propertie relationship of Na/Ca silicate liquids under pressure by mollecular dynamics simulation

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Peculiar behabiours of physical properties of silicate liquids under high pressure are long standing issue in high pressure earth scinence. For instance, it is well known that shear viscosities of acidic silicate liquids decreases with increasing pressure [1, 2]. In order to explain the softening of silicate liquids at high pressure, several mechanisms have been proposed by various researchers [1, 3]. To investigate the relationship between structure and properties of silicate liquids, we apply the molecular dynamics method to obtain precise information on structures of silicate liquids under high pressure.

Molecular dynamics simulations of $Na_2O{\cdot}nSiO_2$ and $CaO{\cdot}nSiO_2$ liquids were performed using the MXDORTO code. The simulated pressure range is from 0.1 MPa to 6 GPa with NPT ensembles and the potential model which well reproduces structures various silicate crystals [4].

In the compression, Si-O and M-O distance remains constant, however Si-Si distances shorten and coordination numbers of O atoms around M atom increase. Adding to those, 3 and 4 membered rings in –Si-O- network decrease with increasing pressure. Those suggest that densification of silicate liquids consist of increasing of flexibility of –Si-O- network, bending of Si-O-Si and increase of coordination number of M atoms. Up to 6 GPa, the decrease of Si-O-Si angle and distrotion of SiO_4 tetrahedra in acidic silicate liquids ($n<3$) are obveously confirmed. Decrease of Si-O-Si angle by densification causes distortion of SiO_4 tetrahedra and weakening of Si-O bonding [5]. These structural change might cause the softening of silicate liquids under high pressure. Deferences between Na and Ca was observed in structure, properties and behaviours of those at hige pressure.

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