



Large Sn,Sn-W deposits (Solnechnoye, Iultin, Khiganskoye, Far East of Russia): genetic features from stable isotope and fluid inclusions data

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Large Sn (Solnechnoye, Khiganskoye) and Sn-W (Iultin) deposits are situated in the contact areas of granite massifs of final stages of magmatic differentiation. Fluids, which formed mineral associations of veins and greisen bodies, were heterogeneous, while mineralized zones of the Solnechnoye deposit were formed by homogeneous water solutions. Trends of chemical evolution of the mineral-forming solutions were common for all the system studied. Early sodium chloride fluids gave way to more dilute, more alkaline bicarbonate- chloride- fluoride ones. The fluid inclusions data may be interpreted as possible result of coming exogenic waters of initially meteoric origin into the ore forming system.

Oxygen and hydrogen isotope composition of the fluids in the discharge zone of the studied deposits bears witness to the presence of meteoric waters from the productive stages. The analysis of oxygen isotopic composition of country rocks around the hydrothermal systems showed that in the case of the Solnechnoye deposit $\delta^{18}\text{O}$ values are 4-8‰, lower than for the unaltered alevrosandstones taken far away from the mineralized zone. In the case of the Iultin deposit $\delta^{18}\text{O}$ values decreased monotonously from the initial 12‰ (1km from the contact) to 3-5‰, at the contact with granite. During the development of vein ore bodies the wall rocks were altered insignificantly in oxygen isotope composition, whereas the notable depletion of the wall rocks in $\delta^{18}\text{O}$ took place during the final stage, when meteoric waters dominated in the system. The Khiganskoye Sn deposit was characterized by $\delta^{18}\text{O}$ values from 4,0‰,

for low altered acid volcanites up to negative ones for the country rocks in contact with the mineralized zones. So, we may conclude, that the processes of interaction of wall rocks with flows of meteoric waters and their mixing with magmatogeneous fluids dominated during the formation of the large scale Sn, Sn-W deposits.

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