

Carbonate-rich silicate veins and their roles in the formation of gold deposits, Jiaodong Peninsula, China

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Jiaodong Peninsula is located in the eastern side of the North China Craton (NCC) and has been a hotspot of geological study for its gigantic scale of gold mineralization. It is defined as the largest gold province in China and the third largest gold producing area in the world. Genetic type of the Jiaodong gold deposits were linked with the collision between the NCC and the SCC, or subduction of paleo-Pacific plate, or the processes of craton destruction and thinning. However, their origin has been controversial.

In general, K-feldspar alteration, sericitization and pyrite-sericite-quartz alteration occurred in the host granitic rocks. The third was accompanied by gold precipitation. The last stage carbonation and quartz-carbonate alteration is not abundant, nor widespread, and were commonly regarded as a sign to indicate the end of mineralization. The study specifically on carbonate mineral was quite limited.

However, some carbonate-rich veins, such as carbonate-spot mafic dykes and siderite-quartz veins, have been found in Jiaodong Peninsula. The carbonate-spot mafic dykes are intruded into the Mesozoic granitic bodies and Precambrian metamorphic basement. The siderite-quartz veins usually occurred in footwall of the main fault in the gold ore. Combining field investigation with microstructural analyses, element analyses, isotope analyses and dating, the carbonate minerals can be identified in multiple stages. The siderites were formed during the process from sericitization to quartz-carbonate alteration. Mantle-derived materials can be found in some carbonate-rich silicate veins.

We suggest that carbonate-rich silicate fluids take a very important role in the forming of gold deposits, and these fluids are probably products of partial melting of metasomatized mantle.

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