The Labuzaika gold deposit is located at the northwest edge of the Dewulu quartz diorite stock in the Xiahe-Hezuo area, northwestern portion of the Western Qinling orogen. Gold mineralization is dominated by sheeted gold-quartz veins mostly hosted in the Dewulu quartz diorite, but locally in the hornfels and marbles around the intrusion. Minor amounts of skarn Au ores, having a geochemical association of Au-As-Cu-Bi-Sn-Ag, occur at the southern and northern contact zone of the Dewulu quartz diorite, which are cut through by a number of sheeted veins. The skarn Au ores have a metallic mineral assemblage consisting of arsenopyrite, pyrite, chalcopyrite, marcasite, pyrrhotite, sphalerite, tetrahedrite, and stannite that are associated with garnet, diopside, tremolite, actinolite, chlorite, quartz, and ankerite. Optical petrography and SEM-EDS analysis reveal abundant gold minerals in both types of mineralization. Gold minerals in the skarn ores occur mostly as electrum inclusions in chalcopyrite or along microfractures of arsenopyrite, and are closely associated with abundant bismuth minerals. Gold minerals in the sheeted vein consist of electrum and kustelit included in boulangerite, freibergite and bournonite or filling microfractures within arsenopyrite. The close relationship between gold and bismuth minerals in the skarn ores indicate that gold may have been scavenged by liquid bismuth in the high temperature magmatic-hydrothermal fluid (Cockerton et al., 2012), and temperature decreasing has led to coprecipitation of the gold and bismuth minerals. Gold in the sheeted veins may have been complexed as $[\text{Au}^+(\text{SbS}_3)]^{2-}$, and pressure or temperature decreasing of the hydrothermal fluid and water-rock reaction could have been the mechanisms for gold deposition (Boyle et al., 1979; Schwartz, 1944).

The field relations and mineralizing features suggest the Labuzaika gold deposit can be considered as an intrusion-related gold system (Lang et al., 2001) consisting of two consecutive stages of mineralization. The early stage skarn ores have a genetic relation with the Dewulu quartz diorite, whereas the late stage sheeted veins may have derived from an evolving magma chamber beneath the consolidated Dewulu quartz diorite. Zircon U-Pb dating indicate that the Dewulu quartz diorite was emplaced at 238.4 ± 1.9 Ma. This age is regarded as the best estimate for the timing of the skarn ore formation. Direct dating of the sheeted veins has not been available but a middle Triassic age is assumed based on an integration of the regional geological and metallogenic data. It is concluded that the Labuzaika gold deposit formed in early to middle Triassic under an active continental margin setting associated with the northward subduction of the Paleo-Tethys Ocean.

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**References**


