Paper Number: 2615

Mineralogical study and fluid characteristics of the Olon Ovoot gold deposit, southern Mongolia

Sarantuya, Oyungerel[1,3], Nakanishi, Tetsuya[2], Yonezu, Kotaro[1], Tindell, Thomas[1], Watanabe, Koichiro[1] and Sereenen, Jargalan.[3]

[1]Faculty of Engineering, Kyushu University, Fukuoka 819-0395, Japan Email: oyun@mine.kyushu-u.ac.jp

[2]Kyushu University Museum, Kyushu University, Fukuoka 812-8581, Japan

[3]School of Geology and Mining, Mongolia University of Science and Technology, Ulaanbaatar 14191, Mongolia

The Olon Ovoot orogenic gold deposit is located within the Ulziit Metallogenic Belt, Mandalovoo island arc terrane, Mongolia [1, 2]. The quartz diorite-hosted deposit is situated along the southern domain of the Main Mongolian Lineament in rocks that define a back-arc basin trapped behind the Kazakh–Mongol arc [3]. The Olon Ovoot deposit area occurs along an accretionary belt, with four gold deposits, and approximately 40 gold occurrences.

The geology of the Olon Ovoot area is composed of highly deformed Silurian metasedimentary rocks comprising sandstone, siltstone, limestone, shale, mudstone, slate, phyllite, and greenschist. These are intruded by Permian or Devonian(?) gabbro and diorite bodies. There are four auriferous quartz vein zones, with a maximum width of 10 m and extending for 50 to 100 m, arranged in an arc form to the west of Olon Ovoot Fault.

Microscopic study and ICP-MS analysis suggest two types of mineralized systems. These include high-grade gold (from 1 to 374 g/t) associated with fault-fill quartz-carbonate veins (vertical) in the main shear zone and low-grade gold (from 0.1 to 50 g/t), occurring in fractures within disseminated pyrite grains in gabbro and diorite near extensional quartz veins (horizontal). According to microscopic observations, the dominant gangue phase in high-grade ore is milky quartz, carbonates, and tourmaline. Metallic minerals consist of gold, pyrite, chalcopyrite, chalcocite, and galena. The low-grade ore is composed of only the disseminated auriferous pyrite grains in the host rock.

Reconnaissance fluid inclusion microthermometry shows liquid-rich two-phase (liquid and vapor) primary fluid inclusions in quartz and quartz-carbonate veins from both mineralized systems. The fluid inclusions observed vary from circular to irregular in shape, and from 2-8 μm in width and 5-12 μm in length. The homogenization temperatures for the fluid inclusions from the fault-fill quartz veins range

from 253°to 348°C, with ice melting temperatures from -4.1° to -2.9°C that suggest a salinity range of 4.8 to 6.6 wt.% NaCl equiv. In addition, the homogenization temperatures for the fluid inclusions in the extensional quartz veins range from 242° to 310°C, and the ice melting temperatures range from -2.4° to -3.1°C, suggesting a salinity range of 4.0 to 5.1 wt.% NaCl equiv. Fluids are therefore typical low salinity, medium temperature fluids characteristic of the lode gold field using the summary diagram of Roedder et al. [4, 5].

References:

[1] Lamb MA and Badarch G (1997). International Geology Review 39: 542-576.
[2] Dejidmaa Gand BadarchG (1999). Geological Survey: 99–165
[3] LambMA and BadarchG (2001) Geological Society of America Memoir 194:117–149

[4] RoedderE(1984) Mineralogical Society of America 12:644

[5] WilkinsonJJ (2001) Lithos 55:229-272