

## **Ore mineralogy, and fluid inclusion and stable isotope study of the Olon Ovoot gold deposit, southern Mongolia**

Oyungerel Sarantuya\*, Tetsuya Nakanishi, Kotaro Yonezu, Thomas Tindell, Adrian Boyce, Koichiro Watanabe, and Jargalan Sereenen

Kyushu University, Fukuoka, Kyushu, Japan, \*e-mail, [oyun@mine.kyushu-u.ac.jp](mailto:oyun@mine.kyushu-u.ac.jp)

The Olon Ovoot gold deposit is located in Mandal-Ovoo soum, South Gobi province, 500 km from Ulaanbaatar. The area belongs to the Gobi-Altai terrane and is within the Ulziit Gold Belt along the Main Mongolian Lineament Fault, south Mongolia. The orebodies are hosted by an intrusions at the Olon Ovoot orogenic gold deposit and occur within a NW-striking shear zone. Five gold deposits and about 40 gold occurrences were explored along the belt.

There are four auriferous quartz vein zones in the Olon Ovoot deposit area, which are Tsagaan Tolgoi, and East, Central and Khuren Tolgoi, with a maximum width of 10 m and lengths ranging from 50 to 100 m, arranged in an arc form to the west of Olon Ovoot Fault. The geology of the Olon Ovoot area is composed of highly deformed metasedimentary rocks of Silurian age which are cut by Devonian(?) gabbro-diorite intrusions. The gabbro-diorite typically contains gold mineralization of disseminated ores and auriferous quartz veins. The disseminated ores (3.1 to 50 g/t Au) in gabbro-diorite comprise pyrite, altaite, and native gold and the auriferous quartz veins (2.6 to 374 g/t Au) in the shear zone contain galena, chalcopyrite, pyrite, native gold, covellite, chalcocite, altaite, magnetite, and hematite. The auriferous quartz veins are more economically significant than the disseminated ores .

A fluid inclusion microthermometry study detected liquid-rich two-phase (liquid and vapor) primary fluid inclusions. Inclusion shape is circular to irregular and between 2-8  $\mu\text{m}$  in width and 5-12  $\mu\text{m}$  in length. The homogenization temperatures of the fluid inclusions from auriferous quartz from the shear range from 260° to 350°C, and they have salinities of 4.8 to 6.6 wt. % NaCl equiv., and extensional quartz veins have homogenization temperatures that range from 240° to 310°C, and salinities of 4.0 to 5.1 wt. % NaCl equiv. Sulfur isotopes were measured for the pyrites and show a narrow range from 0.1‰ to 2.4‰. The S source based on the  $\delta^{34}\text{S}$  values may have been a magmatic reservoir. The measured  $\delta^{18}\text{O}$  values from auriferous quartz and extensional quartz veins were restricted and showed a variation between 8.4‰ and 9.7‰ and between 8.2‰ and 9.0‰, respectively. Finally, characteristics of mineral assemblages and the ore-forming fluids in Olon Ovoot gold deposit indicate it to be an orogenic gold deposit, particularly a magmatic source type.