

Rutile geochemistry of Gubong Au deposit, Republic of Korea

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The Gubong Au deposit is located in the Chenan metallogenic province, one of the most important gold production areas in the Republic of Korea. This deposit is the richest gold deposit in the province and consists of five massive ribbon-banded quartz veins that fill fractures oriented northeast and northwest along fault shear zones in Precambrian metasedimentary rocks of the Gyeonggi massif.

Ores and alteration minerals of Gubong deposit are sericite, chlorite, epidote, illite, K-feldspar, plagioclase, biotite, quartz, calcite, magnetite, ilmenite, rutile, zircon, monazite, apatite, pyrite, gersdorffite, arsenopyrite, pyrrhotite, sphalerite, marcasite, chalcopyrite, galena and electrum.

Rutiles occur in alteration and mineralized zones. Trace element analyses in the rutiles in the two zones were performed using EPMA and LA-ICP-MS (193-nm ArF Excimer laser combined with a Elan 6100 quadrupole mass spectrometer). Concentration of trace elements from two zones are Mg (45.8~1923.1 ppm, 48.3~21519.8 ppm), Al (44.3~9328.6 ppm, 113.6~56660.2 ppm), Sc (<1.2~50.2 ppm, 2.2~13.8 ppm), V (2.2~79.1 ppm, 37.5~283.7 ppm), Mn (<1.0~699.9 ppm, 1.8~593.6 ppm), Fe (546.6~14717.7 ppm, 4364.7~109116.4 ppm), Zn (6.3~67.1 ppm, 7.0~420.3 ppm), Y (0.4~1043.2 ppm, 2.0~242.8 ppm), Nb (629.0~2703.5 ppm, 3024.9~3877.1 ppm), Sb (<1.5~8.5 ppm, 4.7~17.0 ppm), Ta (25.8~312.3 ppm, 355.1~624.7 ppm) and W (36.0~2737.9 ppm, 24.5~2654.5 ppm), respectively. Mg, Al, V, Fe, Zn, Nb, Sb and Ta concentrations in rutile from mineralized zone are higher than those from alteration zone.

We compared the trace element composition in rutiles from other major Korean ore deposits to compare hydrothermal fluid condition and to provide a geochemical tool for mineral exploration.