

Chang-Yoon PARK, Yungoo SONG, Il-Mo KANG, Donghoon JUNG and Khulganakhuu CHULUUNBAATAR 2013. Mineral Chemistry and Age Dating of W-skarn Deposit at Weondong mine, Taebak in Korea *Acta Geologica Sinica* (English Edition), 87(supp.): 676-677.

Mineral Chemistry and Age Dating of W-skarn Deposit at Weondong mine, Taebak in Korea

Chang-Yoon PARK¹, Yungoo SONG¹, Il-Mo KANG², Donghoon JUNG¹
and Khulganakhuu CHULUUNBAATAR¹

¹ Department of Earth System Sciences, Yonsei University, 134, Shinchon-dong, Seodaemun-ku, Seoul, 120-749, Korea

² Korea Institute of geosciences and Mineral Resources, Daejeon, Korea

The geology around Weondong mine area consists mainly of Carboniferous-Triassic formations and Cambro-Ordovician formations intruded by quartz porphyry and dyke. The skarn mineralized zone in the Weondong mine area is the most prospective region for the useful mineral deposits. This research aims to characterize the skarn minerals and the type of scheelite-powellite, to define the ore-forming conditions, and to determine the ages of skarn mineralization and hydrothermal alteration. SEM-BSE observation, XRD, and WDS-EPMA analysis for the skarn minerals indicate that the skarn mineral association is calcic and, diopside- andradite rich. Scheelite contains powellite content up to 70wt%, although this contents depend on the mineral associations of scheelite-containing skarns. To determine the skarn-mineralization age, K-Ar and U-Pb SHRIMP daing method were employed. The age of massive phlogopite, crystalline phlogopite, and massive vein type illite are determined 42.7Ma, 42.7Ma, 48.3Ma, respectively. Each zircon U-Pb age result of quartz porphyry intrusion and feldspar porphyry dyke represents as 79.37Ma, 50.64Ma.

Weondong mine's volcanic activity occurred at the Late Cretaceous and Paleocene, and it can be interpreted by Inazagi plate's orthogonal subduction related to Bulguksa volcanism in Korea. Through the K-Ar age datings of phlogopite and illite, we suggest that the timing of skarn mineralization in Weondong mine is Paleocene (<50.64Ma). However, hydrothermal alteration age is controversial whether the volcanic activity was continued from feldspar porphyry dyke as just only one source or not. The occurrence of scheelite(powellite-rich), diopside

(Mg-rich, Fe²⁺ poor), andradite(Fe³⁺ rich) indicate that the Weondong skarn deposit was formed under relatively oxidized condition. In accordance with this study, these results can supply some useful information to explore the hidden poly-metallic mineral deposits in the Weondong area and be applied another oxidized skarn deposits.

Key words: Weondong mine area, tungsten-bearing skarn mineral, U-Pb(SHRIMP), K-Ar age dating.

Reference

- Meinert LD, 1992, Skarns and skarn deposits. *Geoscience Canada* 19:145162
- Einaudi, M.T., Meinert, L.D., Newberry, R.J., 1981. Skarn deposits. *Econ. Geol.* 75th Anniversary Volume, pp. 317391.
- Zaw, K., Singoyi, B., 2000. Formation of Magnetite-Scheelite Skarn Mineralization at Kara, Northwestern Tasmania: Evidence from Mineral Chemistry and Stable Isotopes. *Economic Geology and the Bulletin of the Society of Economic Geologists*, 95(6): 1215–1230
- Xie, G.Q., Mao, J.W., Zhao, H.J., Wei, K.T., Jin, S.G., Pan, H.J., Ke, Y.F., 2011. Timing of skarn deposit formation of the Tonglushan ore district, southeastern Hubei Province, Middle-Lower Yangtze River Valley metallogenic belt and its implications. *Ore Geol. Rev.* doi:10.1016/j.oregeorev.2011.05.005.
- S. Maruyama, Y. Isozaki, G. Kimura, M. Terabayashi, 1997. Paleogeographic maps of the Japanese Islands: Plate tectonic synthesis from 750Ma to the present. *Island Arc*, p.121142.
- Park Hee-in, Chang Ho wan and Jin Myung shik, 1988. K-Ar ages of mineral deposits in the Taebaeg Mountain district. *Jour. Korean Inst. Mining Geol.*, Vol.21, No.1, p.57-67.
- KIGAM (2012) Evaluation of development possibility for the security of industrial mineral resources (Cu, Pb, Zn, Au etc) on the domestic mines. Report, Korea Institute Geoscience and Mineral Resources.

* Corresponding author. E-mail: changyun@yonsei.ac.kr

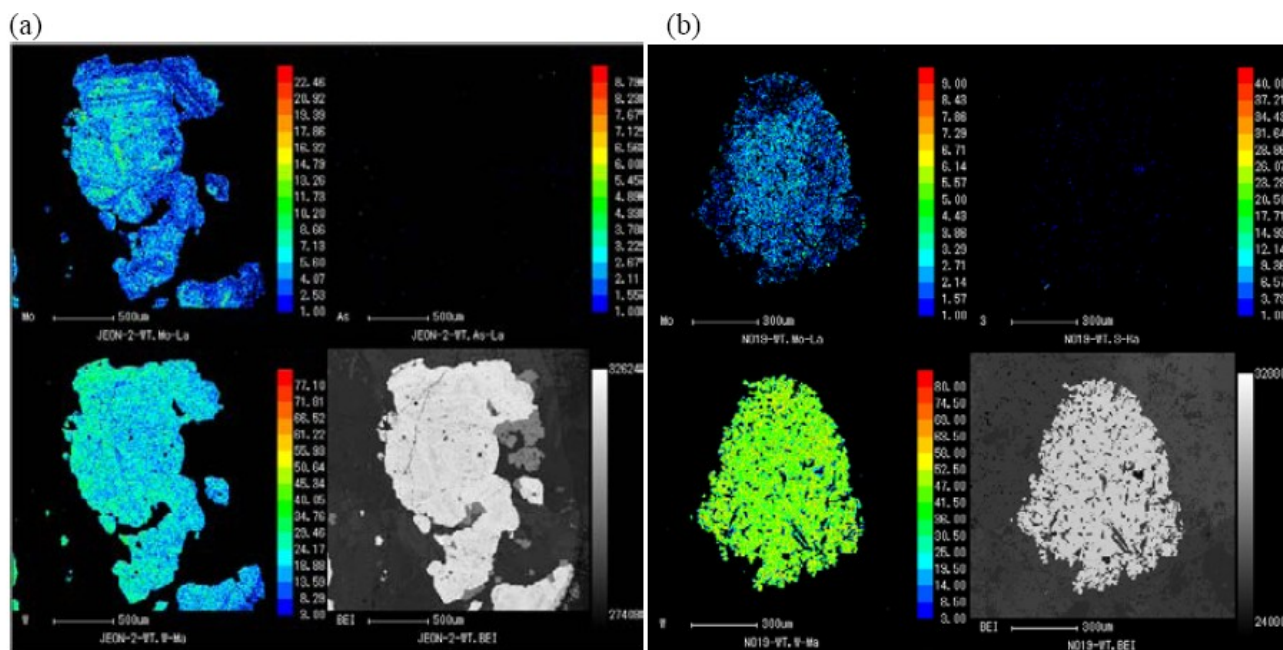


Fig1. Mapping of scheelite-powellite using WDS-EPMA (a)Composition map of Scheelite-powellite in the diopside zone. that mineral which coexists with diopside contains high Mo(wt%) contents, relatively. Also, a difference of Mo contents is represented as oscillatory zoning (b)Composition map of Scheelite-powellite in the garnet (andradite) zone. Mo(wt%) contents is low compared to scheelite powellite in diopside zone

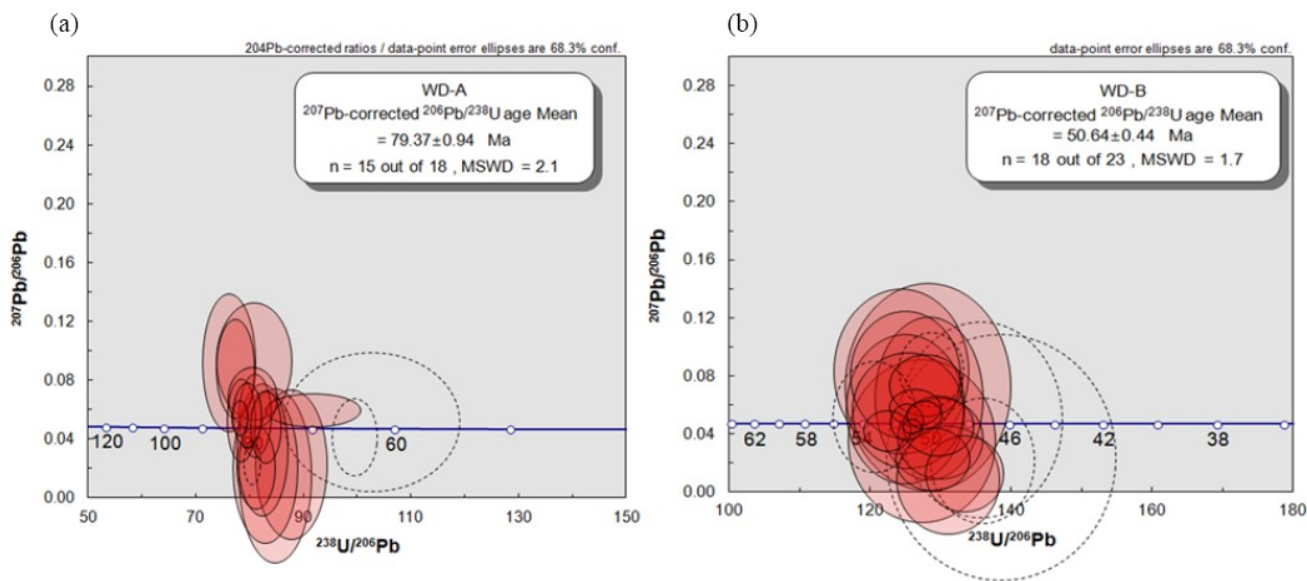


Fig2. (a)Concordia diagram for the SHRIMP zircon U-Pb age dating analyses for quartz porphyry (b) Concordia diagram for the SHRIMP zircon U-Pb age dating analyses for feldspar porphyry dyke.