# Tungsten behavior in skarn garnet: implications for tungsten ore exploration

CHANGYUN PARK[1], LI ZHANG[1], WOOHYUN CHOI[1], HA KIM[1], AND YUNGOO SONG[1]

[1]Yonsei Univ. BK21+ institute of Earth. Atmosphere. Astronomy, Seoul, Korea
changyun@yonsei.ac.kr

Andradite garnet in skarn deposits from the Taebaeksan mineralized district is characterized by high tungsten content (up to hundreds of ppm) compared to grossular garnet from the same area. We report a W-anomaly in garnet crystals from the vein system of the skarn deposit and identify a relationship between garnet trace element composition and W mineral exploration. The Sangdong/Weondong skarn deposits are mainly composed of grandite (grossular–andradite) garnets that show compositional variations. The garnets were collected from a vein system above an exoskarn zone. The chondrite-normalized REE patterns of Al-rich garnets are HREE-enriched. In contrast, Fe-rich garnets are LREE-enriched. Tungsten is strongly fractionated into the Fe-rich garnets (average concentration: 618 ppm), compared to the Al-rich rims (average concentration: 19 ppm). The Fe-rich garnets are attributed to rapid growth by infiltration metasomatism in disequilibrium, which caused the incorporation of W and REEs into the garnet structure. Consequently, the concentration of W in garnet is determined primarily by the skarn environment and crystal growth mechanisms, which makes andradite a useful indicator mineral in the exploration of tungsten ore deposits.