

Metasomatism of grandite garnet in the Weondong polymetallic deposit

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The Weondong skarn deposit is mainly composed of grandite garnets (andradite-grossular garnet), showing altered texture and compositional zoning by metasomatism. The chemical characteristics of the grandite garnets were defined by using SEM-BSE observation, EPMA-mapping, and LA-ICPMS analyses. The garnets were classified into 3-types based on their textural characteristics and rare earth element (REE) concentrations. Garnets are divided as 3-types; (1) garnet re-equilibrated by K-rich mineral (type-I), (2) intergrowth with K-rich mineral (type-II), (3) vein-hosted garnet (type-III) with pressure-induced texture. These garnet's textural features are considered to be periodic fluid fluctuation. In the chondrite-normalized REE patterns of these types, Al-rich garnets are HREE-enriched. According to kinetics of garnet growth, Al-rich garnets were formed at equilibrium and slow growth rate. On the contrary, Fe-rich garnets are slightly LREE-enriched and flattened in HREEs. At the kinetic of garnet growth, Fe-rich garnet has grown rapidly, from external derived fluids, during infiltration metasomatism. Also, each type of garnet grain was differently influenced by fluid/rock interaction, magnitude of fluid flow and fluid compositions depending on spatial or temporal in the skarn system. As a result, periodic fluid fluctuation in the skarn system can affect morphology of garnets. And, geochemical features of the grandite garnet from the Weondong polymetallic deposit provides key information to understand the evolution of the skarn deposit and metasomatic history.