

Petrochemical study on the host rock of tremolite-talc ore in Poongjeon talc deposits

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The geology of Poongjeon talc deposits consists of sedimentary rocks of the Cambro-Ordovician Samtaesan Formation, amphibolite, Muamsa granite and basic rock which intruded the sediments. Geochemical analysis using XRF and ICP was conducted to evaluate the role of host rocks and ore fluids in tremolite-talc formation.

In chondrite-normalized REE patterns, Amphibolites show no distinct Eu anomaly and their patterns are uniform and similar in shape. Whereas REE concentrations of carbonate rocks are much lower than those of amphibolite, and are similar to those of tremolite-talc ore. The patterns are rather steep at LREE and becomes gentle at HREE and they show slightly negative Eu anomalies. The patterns of tremolite-talc ore show similar features to those of carbonate rocks. Enriched LREE slopes become almost flat at HREE and they also show negative Eu anomalies.

In case of post-Archean Australian shale-normalized REE patterns, the carbonate rock is characterized by low REE contents and a flat REE pattern with a negative Ce anomaly, which is typical for marine carbonates. The tremolite-talc ore, though it is weak, also shows Ce anomaly and shows no distinct Eu anomaly unlike amphibolite. The REE patterns of tremolite-talc ore show counterclockwise rotation in relation to carbonate rock, which indicate the decrease of LREE/HREE ratio of tremolite-talc ore in comparison to the possible REE source, carbonate rock due to enhanced complex stability of HREE in relation to LREE during remobilization.

As for MORB-normalized trace element patterns, amphibolites show relatively uniform patterns and represent Zr-Hf depletion. Mobile elements such as Sr, K, Rb, Ba for carbonate rock and tremolite-talc ore are highly disturbed whereas their immobile elements show relatively uniform patterns. The patterns of carbonate rock and tremolite-talc ore show steep slopes in Ta-Nb and distinct negative Ti-anomalies.

These results suggest that the carbonate rock may have played an important role in tremolite-talc formation as a host rock in the Poongjeon talc deposits.