

REE geochemistry and mineralogy of ores from the Talgan Cu-Zn massive sulfide deposit, South Urals

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The high REE contents (57.23–561.2 ppm) of thin-layered sulfide ores of the weakly metamorphosed Talgan Cu-Zn massive sulfide deposit (South Urals) are related to the presence of galgenbergite, parisite, bastnesite, synchysite and xenotime, which were found for the first time in massive sulfide ores of the Urals. These minerals occur in quartz-carbonate-chlorite matrix of sulfide layers, as well as pyrite nodules and zoned sub- and euderal crystals, which were formed as a result of diagenetic growth of sulfide clasts (Fig.).

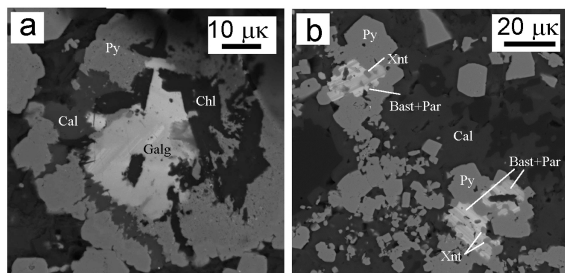


Fig. a – galgenbergite (Galg) associated with calcite (Cal) and chlorite (Chl) in central zone of pyrite nodule (Py), b – parisite-bastnesite (Par+Bast) intergrowths with xenotime (Xnt) inclusions in pyrite (Py) aggregates. SEM-photo.

The chondrite-normalized REE patterns are enriched in LREEs relatively to HREEs and the presence of weak negative cerium and positive europium anomalies. The LREE contents decrease by an order of magnitude and the LREE and HREE contents become similar with decreasing amount of hyaloclastic material in sulfide layers. The thin layered sulfide ores are thought to represent chimney collapse and redeposited at peripheral hydrothermal vent sites, and mixed with background carbonate-hyaloclastic material. The REEs for the formation of REE minerals are derived from hyaloclasts as a result of alteration of sulfide-hyaloclastite layers during halmyrolysis–diagenesis. This work was supported by the RFBR (project no. 14-17-00691).