

Origin of Shale-Hosted Copper-Lead Ores in the Viburnum Trend, Southeast Missouri Lead District, USA

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Local occurrences of exceptionally fine-grained copper-lead ores, known best at the Casteel and No. 28 mines, contrast markedly with typical lead-zinc ores in the Viburnum Trend, Southeast Missouri Lead District, USA. These ores are stratiform, aphanitic, distinctly banded, extremely high grade, and shale-hosted.

Ore microscopic study shows that these ores consist of very small grains (1-7 μm) and fine-grained dendritic growths of galena and chalcopyrite. Such textures indicate that the ores have formed by rapid deposition under conditions that were especially favorable to sulfide deposition.

Three possible hypotheses for their origin have been considered during the study of these unusually fine-grained, shale-hosted ores. 1) Although no syngenetic (nor diagenetic) ores have previously been recognized in the district, they exhibit some of the features that would be expected for such an origin, such as fine-grained character, distinct banding, stratiform nature, and confinement to certain stratigraphic horizons. 2) Their occurrence at the base of a breccia pile could support an origin by replacement of karst internal sediments, similar to some ores in the Polish zinc deposits. 3) The writers believe that the ores formed by the replacement of shaly facies within the Bonneterre Dolomite. Features that support this interpretation are - the orebodies show a gradual transition into unreplaced shale, have the same thicknesses as the replaced shales, and contain unreplaced remnants of shale.