

Evidence for Ore Deposits in Midwestern Black Shales

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Some deposits, such as the Kupferschiefer and Alum shales of Europe, the rich ores of the Cu Belt of Africa, and Precambrian through Paleozoic strata of western Canada and the United States, contain abundant base metals (Cu, Zn, Pb) with or without roll-front suite elements (Mo, V, Ni, U) that accumulated from multiple episodes of mineralization. In other cases, ore-grade mineralization, exemplified by the McArthur River basin Pb-Zn Ag deposits of Australia and Ni-Mo ores of China, contained metals were probably introduced during sedimentation from exhaling brines of sedimentary or volcanic origin.

All of these examples, excepting midwestern shales of the United States, are known to be associated with important shale-hosted ore deposits. The American shales, which contain thousands of grams per tonne Zn, V, and Mo throughout areas exceeding 10,000 hectares, overlie the type occurrences of Mississippi Valley-type Zn-Pb deposits. It seems likely that ores similar to the Chinese deposits, to sedex Pb-Zn deposits or to the Kupferschiefer could be present in this vast region of metalliferous shale. Clues to the presence of ore deposits include substantial fluctuations in assay values in shales that are consistently enriched in metals. Systematic investigations of metalliferous beds in the vicinity of important structural dislocations that, up to now, have been inadequately explored may prove worthwhile economically provided the climate for domestic exploration in the United States improves.