

POTENTIAL FOR HYDROTHERMAL PLATINUM MINERALIZATION IN THE WESTERN WYOMING OVERTHRUST BELT

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ABSTRACT

Certain features of the western Wyoming overthrust belt make it a favorable area for hydrothermal platinum-group element (PGE) mineralization.

Hydrothermal PGE mineralization in worldwide examples typically occurs with more abundant base-metal or first row transition-metal mineralization. PGE enrichments commonly accompany Cu, Ni, Co, Fe, Mn, V, or some combination thereof. Also, PGE-enriched gold deposits are known and a Au-U-PGE association has been suggested. Aside from the more common association of hydrothermal PGE mineralization with mafic/ultramafic rocks, at least two occurrences with probable black shale affinity can be cited (Kupferschiefer, Europe, and Gibellini, Nevada).

The western Wyoming Overthrust Belt hosts a number of unusual metal deposits of probable epigenetic hydrothermal type as well as metal-enriched black shale of probable syngenetic origin. The epigenetic mineralization commonly occurs at the bleached Nugget Sandstone/Twin Creek Limestone contact. These deposits include concentrations of one or more of the first row transition elements Cu, Zn, Co, Ni, Cr, and V as well as Mo, Cd, Pb, U, Ag, and/or Au. It has been suggested that the epigenetic mineralization may have been caused by metal-rich basinal brines that were expelled from the metalliferous Phosphoria Formation. Platinum-group elements are enriched in black shales and recent solubility experiments indicate that they may have migrated as well.

Platinum-enriched Au placers with no known lode source are reported from the Snake River in western Wyoming and the area can be shown to be in a regionally favorable zone for hydrothermal PGE mineralization. Recent discoveries of carbonate-hosted PGE enrichments in the southern Great Basin indicate that exploration outside of layered mafic/ultramafic terrains is warranted.

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