

Magnetic Ilmenite-Hematite Detritus in Mesozoic-Tertiary Placer and Sandstone-Hosted Uranium Deposits of the Rocky Mountains

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Abstract

Mesozoic and Tertiary sandstones throughout the Rocky Mountains region of the United States contain a detrital Fe-Ti oxide mineral that is generally regarded as unusual and is preserved wherever these sandstones have escaped destructive diagenesis. This mineral, a medial ilmenite-hematite solid solution, is highly magnetic and has sometimes been mistaken for magnetite. We have encountered this mineral in paleomagnetic studies and in investigations of sandstone-hosted uranium deposits and Cretaceous shoreline placer deposits. It is known to occur elsewhere in intermediate volcanic rocks, consistent with quenching from hypersolvus high-temperature conditions. The detrital occurrences we describe are of economic importance in uranium deposits, where they are among the reductants that precipitate uranium, and in Cretaceous placer deposits, whose exploitation would require a separation procedure tailored to this mineral. The distribution of detrital hematite-ilmenite sandstones in Cretaceous rocks suggests a contemporaneous volcanic source in the northern Rocky Mountains.