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Iron-rich precipitates in a mine drainage environment: Influence of pH on mineralogy

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ABSTRACT

Ochreous precipitates deposited by waters draining a sulfide-rich lignite seam exposed in an abandoned mine in the Czech Republic show marked variations in color and mineralogy as a function of effluent pH. When initially formed under acidic (pH 3.7) conditions, the precipitates are orange in color and their mineralogy is dominated by schwertmannite. Following confluence with alkaline (pH 8.3) waters that have not been affected by mine drainage, the effluent pH rises to 7.3, the color changes abruptly to reddish-brown, and the principal precipitate mineral is a two-line ferrihydrite. This change in mineralogy and the associated variation in color can thus serve as direct indicators of the genetic environments under which the minerals were formed.