

Characterization and Geochemical Modeling of Cu and Zn Sorption Using Mixed Mineral Systems Injected with Iron Sulfide under Sulfidic-Anoxic Conditions I: Case Study of Cwmheidol Mine Waste Water, Wales, United Kingdom

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Abstract : This study investigates sorption of Cu and Zn contained in natural mine wastewater, using mixed mineral systems in sulfidic-anoxic condition. The mine wastewater was obtained from disused mine workings at Cwmheidol in Wales, United Kingdom. These contaminants flow into water courses. These water courses include River Rheidol. In this River fishing activities exist. In an attempt to reduce Cu-Zn levels of fish intake in the watercourses, single mineral systems and 1:1 mixed mineral systems of clay and goethite were tested with the mine waste water for copper and zinc removal at variable pH. Modelling of hydroxyl complexes was carried out using phreeqc method. Reactions using batch mode technique was conducted at room temperature. There was significant differences in the behaviour of copper and zinc removal using mixed mineral systems when compared to single mineral systems. All mixed mineral systems sorb more Cu than Zn when tested with mine wastewater.

Keywords : Cu- Zn, hydroxyl complexes, kinetics, mixed mineral systems, reactivity

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