



Treatment performances of a manganese ore constructed wetland for lignite-derived water

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ABSTRACT

To reclaim the lignite-derived created during the dehydration procedure of lignite as cooling water; a laboratory-scale horizontal subsurface flow constructed wetland was designed to treat this lignite-derived water in this research. In laboratory-scale wetlands, manganese ore constructed wetland was proven to be a feasible treatment technology for lignite-derived water reclamation. Comparing with lignite constructed wetland, manganese ore wetland showed better removal for all target pollutants including Fe, Mn, Chemical oxygen demand (COD), turbidity, and NH₃-N. The removal efficiencies of COD, turbidity, and NH₃-N increased accordingly with the increase of hydraulic retention time from 2 to 5 d inside both wetlands. With the hydraulic residence times at 5 d, the COD, turbidity, NH₃-N Fe, and Mn removal efficiencies were up to 76.2, 95.0, 84.8, 64.3, and 93.0% in the manganese ore case, respectively. After the treatment of manganese ore constructed wetland the COD, turbidity, ammonia nitrogen, Fe, and Mn concentrations can supply the requirement of national standard of reclaimed water quality (GB/T 19923-2005).

Keywords: Lignite-derived water; Manganese ore; Lignite; Constructed wetland; Wastewater reuse

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