

The chemical and biological characteristics of coke-oven wastewater by ozonation

張怡怡

Chang EE;Hsing HJ;Chiang PC;Chen MY;Shyng JY

摘要.

Abstract

A bench-scale bubble column reactor was used to investigate the biological and chemical characteristics of coke-oven wastewater after ozonation treatment through the examination of selected parameters. Color and thiocyanate could be removed almost entirely; however, organic matter and cyanide could not, due to the inadequate oxidation ability of ozone to remove ozonated byproducts under given experimental conditions. The removal of cyanide and total organic carbon were pH-dependent and were found to be efficient under neutral to alkaline conditions. The removal rate for thiocyanate was about five times that of cyanide. The ozone consumption ratio approached to about 1 at the early stage of ozonation (time <20 min), indicating that easily degraded matter was present, and mostly ozone was used to oxidize the pollutants. As ozonation progressed, the consumption ratio decreased to 0.2, and TOC removal ($\eta(\text{TOC})$) increased to 30%, indicating that easily degraded pollutants were degraded almost entirely. The effect of ozonation on the subsequent biological treatment unit (i.e., activated sludge process) was determined by observing the ratio of 5-day biological oxygen demand to chemical oxygen demand (BOD(5)/COD) and the specific oxygen utilization rate (SOUR). The results indicated that the contribution of ozonation to inhibition reduction was very significant but limited to the enhancement of biodegradation. The operation for ozonation of coke-oven wastewater was feasible under neutral condition and short ozone contact time in order to achieve better performance and cost savings