

# COKE PLANT WASTEWATER TREATMENT BY FENTON REAGENT

KRZYSZTOF BARBUSIŃSKI<sup>1</sup>, JOANNA GŁÓWKOWSKA<sup>2</sup>, KRYSZTIAN TOMYS<sup>2</sup>

<sup>1</sup>Silesian University of Technology, Institute of Water and Wastewater Engineering  
ul. Konarskiego 18, 44-101 Gliwice, Poland

<sup>2</sup>Silesian College of Economics and Administration in Bytom, Department of Environmental  
Protection  
ul. Frycza Modrzewskiego 12, 41-907 Bytom, Poland

Keywords: Fenton reagent, coke plant wastewater, advanced oxidation.

## Summary

The real coke wastewater was effectively treated using Fenton reagent. The most advantageous dose of H<sub>2</sub>O<sub>2</sub> and Fe<sup>2+</sup>/H<sub>2</sub>O<sub>2</sub> ratio were 5 g/dm<sup>3</sup> and 0.2, respectively at pH 3.5. The fastest reduction of COD, phenol, cyanides and thiocyanates was received within the first 20 minutes of Fenton reaction. Nevertheless, in order to achieve the reduction of wastewater toxicity to low toxic level (test using bioluminescent bacteria *Vibrio fischeri* NRRL B-11177); it was necessary to increase the reaction time to 2 hours. More rapid changes of COD, phenol, cyanides and thiocyanates than in the case of changes in toxicity level, may indicate that toxicity is significantly influenced by intermediates that are formed during Fenton reaction. It was concluded that the Fenton oxidation can be considered as a suitable option for the effective pretreatment of coke plant wastewater. However, in order to minimize costs and maximize treatment efficiency, further optimization of treatment system would take into consideration use of combined chemical and biological oxidation process.