Oxidation Communications 39, No 1-II, 493–502 (*2016*)

Petrochemical interactions

LANDFILL LEACHATE TREATMENT USING ADVANCED OXIDATION PROCESSES

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ABSTRACT

This study aimed to establish the efficiency of ozone-based oxidation processes in the treatment of landfill leachate. Two reactors, one equipped with a UV_C lamp, the other subjected to natural sunlight, were set up for experimental purposes. TiO_2 was used as a catalyst in some of the experiments. Four groups of treatment routes, namely $UV_{SUN} + O_3$, $UV_C + O_3$, $UV_{SUN} + O_3 + TiO_2$ and $UV_C + O_3 + TiO_2$, were applied to treat the leachate by using the two reactors. After the application of each treatment route, chemical oxygen demand (COD), oxide reduction potential (ORP), pH, ozone levels and temperatures were measured. Highest COD removal efficiency of 61% was obtained with the treatment route of $UV_{sun} + O_3 + TiO_2$ followed by $UV_{sun} + O_3$ (32% COD removal), $UV_C + O_3 + TiO_2$ (21% COD removal) and $UV_C + O_3$ (19% COD removal). A positive correlation was found between the ORP levels and COD removal efficiency. Use of TiO_2 as a catalyst, increased the COD removal efficiencies, however, did not affect the ORP levels.

Keywords: ozone, titanium dioxide, solar reactor, COD, ORP.

AIMS AND BACKGROUND

Municipal solid waste (MSW) management constitutes today a major environmental, economic and social challenge worldwide, mainly because the waste volume is growing faster than the world population[1]. In most countries, sanitary landfilling is the most common way to eliminate municipal solid wastes. The leachate generated from MSW disposal sites is considered as one of the highly contaminated resources from physical, chemical, and biological point of view. It may pose a severe pollution

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