

Applicability of Nickel and Antimony doped tin oxide (Ni-Sb/SnO₂) Electrode to the Electrochemical Treatment of Leachate from Municipal Solid Waste Landfill

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Abstract

Leachate in municipal solid waste (MSW) landfill has been considered as a serious pollutant affecting natural resources, human health and hygiene due to its toxicity. Leachate contains refractory organic compounds and complex inorganic compounds, moreover it has a strong odour and undesirable colour. Therefore, it is efficiently treated by the advanced oxidation technology as the electrochemical generation of ozone. With respect to electrode materials, Ni/Sb-SnO₂ (NATO) anodes have a high activity and selectivity for ozone and it is expected to have high electrocatalytic oxidation of pollutants and also decolourisation due to degradable mechanisms either direct oxidation (O₃) or indirect reaction through the formation of secondary oxidants such as •OH. The aim of this work is to evaluate the applicability of electrochemical generation of ozone using NATO anodes for decolourisation and degradation of refractory pollutants in real leachate from MSW. In order to achieve, the anodes will be fabricated with varying Ni doping level and operated with different cell voltages and various concentration of electrolyte to investigate the optimization of electrochemical conditions which obtain a high current efficiency. Then, an appropriate anode will be employed for decolourisation and degradation of leachate. The key findings will be discussed.