

Abstract

The aim of the purification of zinc dust is the reduction in heavy metal pollution and the recycling of useful components of zinc dust. It is an environment-friendly task because zinc dust is considered hazardous waste according to EPA. It is generated during the galvanization of steel and smelting operation in an electric arc furnace as the by-product. Electrochemical methods are employed because of their low cost, speed, and simplicity for the recovery of value-added metals from dust. The effect of voltage (2V, 4V, and 6V), electrolytes (NaOH, Citric acid, and Acetic acid), and electrodes (Lead, steel, and aluminum) on electrodeposition was studied. These electrolytes used are biodegradable such as acetic acid, less costly, and selective in electrodeposition. Graphite anode, interelectrode distance, and time duration were fixed for all reactions. Steel cathode at voltage 6 in citric acid as an electrolyte is proved to be effective in the maximum deposition rate of Zn. The deposition rate of Cd and Pb was maximum in NaOH and acetic acid at 2V and 6V on aluminium and steel cathodes respectively.