

ABSTRACT

The purpose of this research is the recovery of chromium from the effluents generated in the chrome plating process in the facilities of a Metalworking industry. These effluents present in their composition: trivalent chromium, hexavalent and traces of other metals; from the chroming process, specifically the reprocessing, since it does not have the installation and the adequate equipment for the recovery. The chromium recovery evaluation of the effluents of the chrome process was carried out by comparing the chemical precipitation with four precipitating agents: calcium hydroxide, Ca(OH)_2 ; sodium hydroxide, Na(OH) ; ammonium hydroxide, NH_4OH and sodium carbonate, Na_2CO_3 .

The results show that the highest percentage of chromium recovery by chemical precipitation is achieved using: sodium hydroxide, Na(OH) ; with a low dose, obtaining 90%. Whereas, with sodium carbonate, Na_2CO_3 ; Four times higher doses than those used with sodium and calcium hydroxides are required to obtain a recovery percentage of 89% chromium.

The working parameters of the chromium recovery line in the effluents were determined in the laboratory, by means of chemical precipitation tests with sodium hydroxide; obtaining a removal of 92% of chromium, by formation of chromium hydroxide at pH of 8 to 9 and then acidification with 98% sulfuric acid at pH of 2 to 3, producing chromic acid, for recycling to the process of chromed.

The chromium recovery line was designed, adapting it to the operating conditions of an industry, for a period of 15 to 30 days. An economic evaluation of the proposal for the implementation of the chromium recovery line was made, obtaining a return time of the investment of 3 years. Therefore, the recovery of chromium, by chemical precipitation with sodium hydroxide from the effluents generated in the facilities of a metalmechanic industry, is viable from the point of view: technical, economic and environmental.