Copper Recovery from Galvanic Industries Through Spontaneous Oxidation

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Metal treatment through galvanic processes is becoming more and more indispensable with climate change, increasing pollution levels and acid rain. Its wastewater treatment creates a hazardous sludge that can not be placed in common landfill sites, as improper disposal can lead to contamination of ecosystems, intoxication of living organisms and other environmental damage. As an aggravating factor, cost and demand for copper are constantly raising while its deposits are depleting. This study is based on the waste treatment through spontaneous oxidation, using steel wool and iron powder as raw material. The principles of electron exchange were applied through oxidation where copper (in cationic form and with a reduction potential greater than that of iron in the metallic state) forces iron oxidation as a function of its reduction. Dangerous sludge also served as raw material for the production of the copper (II) sulphate salt which has a wide application, including the galvanic sector itself. A quantitative analysis of copper through iodometry showed 22% of the metal was obtained in the residue, higher than what is found in the deposits, which ranges from 3% to 4%. The method using steel wool showed similar results to conventional analyzes, totaling a yield of 90%. Within this line of work, we can contribute to principles such as reverse logistics, reduction of transportation costs, storage of the residue and the preservation of natural deposits of metal with the recycling of galvanic sludge, which currently has no applications.

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