MANEERAT ONGWANDEE : HEAVY METALS REMOVAL FROM ELECTROPLATING WASTEWATER USING SODIUM BOROHYDRIDE. THESIS ADVISOR : ASSOC. PROF. ORATHAI CHAVALPARIT., M.Sc. 201 pp. ISBN 974-333-641-9

This research explores methodology of wastewater treatment with using a stable aqueous solution of sodium borohydride (SBH) containing 1.2 % $NaBH_4$ and 4 % NaOH, removing heavy metals from electroplating, namely copper plating, nickel plating, chromium plating and combined wastewater.

The SBH process for copper waste with concentration 550 mg/l requires initial pH adjustment to 4-5 with caustic, then adding sodium bisulfite at 5 times of amount copper in wastewater. Next SBH is added until the pH of solution increased to 7. This process can remove total copper from wastewater according to effluent Thai industrial standard. Moreover, the pH adjustment with lime can reduce copper less than 1 mg/l.

Similarly, nickel waste with concentration 380 mg/l can be respectively processed with adjusting pH to 8.5 with caustic, adding sodium bisulfite at 0.5 times of amount nickel in wastewater, and adding SBH until the pH of solution increased to 9.

For the chromium plating wastewater containing 1460 mg/l Cr^{6+}, 180 mg/l Ni^{2+}, 145 mg/l Cu^{2+}, and 90 mg/l Zn^{2+}, the process is adding sodium bisulfite at 3 times of amount chromium in wastewater, adjusting pH to 8 with caustic, and then adding SBH until the pH of solution increased to 9.

Like the SBH process for chromium wastewater, the combined wastewater containing 1660 mg/l Ni^{2+}, 770 mg/l Cu^{2+}, 250 mg/l Cr^{6+}, 160 mg/l Zn^{2+} and 140 mg/l Fe^{2+} required the same process except adding sodium bisulfite at 1 time, and the final pH as 9.2-9.5.

The treatment cost of the copper plating, nickel plating, chromium plating and combined wastewater, can be respectively identified as 133, 247, 446 and 541 baht/cubic meter for total cost, as 106, 242, 335 and 384 baht/cubic meter for chemical cost, and as 27, 5, 111 and 157 baht/cubic meter for the sludge cost.

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