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Recovery of Copper, Cobalt, Nickel, Cadmium, Zinc and Bismuth from Electrolytic Copper Solution

Firat AYDIN, Ömer YAVUZ

Dicle University, Faculty of Arts and Science

Department of Chemistry, 21280 Diyarbakır - TURKEY

Berrin & Recep ZİYADANOĞULLARI

Dicle University, Faculty of Arts and Science,

Department of Chemistry, 21280 Diyarbakır - TURKEY

 [Keywords](#)
 [Authors](#)



chem@tubitak.gov.tr

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Abstract: An electrolytic Copper Solution (ECS) was electrolyzed using platinum electrodes. Copper was obtained in solid form. In order to precipitate Cd(II), Bi(III), As(III), Sb(III) and the rest of the Cu(II) ions, H₂S gas was passed through the remaining solution. The remaining solution was evaporated to obtain metal sulphates. The sample containing metal sulphates was roasted at temperatures between 550 and 800°C. Cobalt, nickel and zinc in the solid sample remained in the form of metal sulphates, while the iron in the sample was converted into Fe₂O₃. This solid sample was dissolved in water and filtered in order to crystallize the NiSO₄. As a result of crystallization, a maximum yield of 86.2% was obtained. The solid containing metal sulphides (CuS, CdS, Bi₂S₃ and Sb₂S₃) was roasted at 600°C for 3 hours. The roasted sample was dissolved in water and filtered. It was determined that the conversion of CuS into CuSO₄ occurred, together with the conversion of CdS and Bi₂S₃ into CdO and Bi₂O₃. The samples containing CdO and Bi₂O₃ were then leached with 0.5 M H₂SO₄ solution at 50°C for one hour. The extraction yield was 97%.

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