United States Patent [19]

Wiewiorowski et al.

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[54] **ENHANCED SELECTIVITY IN THE SEPARATION OF NICKEL AND COBALT FROM AMMONIACAL SOLUTIONS**

[75] Inventors: **Tadeusz K. Wiewiorowski,** New Orleans; **David J. Miller,** Gretna, both of La.

[73] Assignee: **Freeport Minerals Company,** New York, N.Y.

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 487,559, July 11, 1974, abandoned.

[52] **U.S. Cl.** **423/140;** 423/143

[51] **Int. Cl.**[2] **C01G 51/00;** C01G 53/12

[58] **Field of Search** 423/140, 142, 143; 75/103, 119, 108

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Primary Examiner—Herbert T. Carter
Assistant Examiner—Brian E. Hearn
Attorney, Agent, or Firm—Ronald A. Schapira

[57] **ABSTRACT**

An ammoniacal solution containing nickel and cobalt dissolved as nickel-ammonia complexes and cobalt-ammonia complexes is treated with a material capable of providing free ammonia in the solution, such as gaseous ammonia or aqueous ammonia, in order to increase the proportion of higher nickel-ammonia complexes to lower nickel-ammonia complexes in solution until at least about 85% of the dissolved nickel is in the form of higher nickel-ammonia complexes, i.e., complexes in which the number of NH_3 molecules is greater than 3. The attainment of this high concentration of higher nickel-ammonia complexes is readily determined by various analytical procedures such as, for example, free ammonia electrode measurements and spectrophotometer measurements. The solution is then treated with a sulfiding agent in an amount sufficient to selectively precipitate out the dissolved cobalt as cobalt sulfide. The resulting slurry is separated into a nickel-enriched liquid fraction and a cobalt-enriched solids fraction. Surprisingly, when the dissolved nickel is present as a higher ammonia complex, less tends to undesirably coprecipitate with the cobalt during sulfiding. The highly desirable result is a precipitate containing up to 50% more cobalt and 20% less nickel, and a mother liquor more enriched in nickel, than normally obtained in a conventional selective sulfiding.

19 Claims, 2 Drawing Figures