



## Extractive Metallurgy of Cobalt (Expertise in Metallurgy)

By Roger Rumbu

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As the title suggests this book focuses on the extractive metallurgy of cobalt which is rarely treated in a comprehensive manner as cobalt and cobalt-compounds are typically by-products of nickel and copper production. Introductory chapters cover history, mineralogy, chemical properties as well as reserves and production statistics. Chapter 4 (Cobalt Hydrometallurgy) is one of the main chapters that includes the leaching behaviour of the element with respect to the form of cobalt feed highlighting the importance of oxidation-reduction reactions. There are references to leaching kinetic models and relevant chemical thermodynamic considerations along with a number of examples of industrial process flow diagrams. Impurity precipitation and solvent extraction are also included in this chapter in a similar style with examples of processing equipment. Chapter 5 is a relatively brief chapter about cobalt-compound product precipitation ending with a summary table qualitatively ranking eight process features. Chapters 6 and 7 address the electrowinning and electrorefining of cobalt respectively. Important fundamental and applied considerations are covered. Chapter 8 is on the pyrometallurgy of cobalt with some description of hydrometallurgical refining options at the end. As with the hydrometallurgy chapter, a number of industrial flow diagrams are provided which is helpful. Chapter 9 is about the final uses for cobalt which is shifting with increasing application for cobalt containing batteries. The Metallurgie Extractive du Cobalt provides a good overview of cobalt from the primary sources to end-use with an emphasis on the metallurgical processing options of which there are quite a few. It is most relevant to metallurgical engineers interested in process development. I appreciated the insight provided into the African scene and picked up some useful references from the citations. Dr James Vaughan, Senior Lecturer in Hydrometallurgy The University of Queensland, Australia, March 29, 2016

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