



CHEMISTRY, PROCESSES AND PROBLEMS OF COMPLEX ORES UTILIZATION: HYDROMETALLURGICAL OPTIONS

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ABSTRACT

Since the second world war, the demands for pure elements and other metals hitherto considered rather rare, and usually found in association as complex mineral ores, have increased considerably. The utilization of these minerals as-mined has largely constituted research and technological problems. This paper has addressed the problems of complex ores utilization by considering the nature and compositions of complex ores, the multi-stage hydrometallurgical processes involved in their utilization, reagent types and consumption, energy requirements and waste disposal. The chemistry of the hydrometallurgical processes of these complex ores and the methods of separation of the constituent species has been significantly reviewed.

Key words: Hydrometallurgy, Complex ore, Leaching, Acid, Alkali, Utilization.

INTRODUCTION

Nearly all metals are derived from ores, which are concentrates of minerals situated accessibly at or near the earth's crust. Ores are complex composite materials bearing minerals of several metals. The two important exceptions perhaps are magnesium, which may also be won from sea water, and plutonium, which is produced in atomic reactors. Ores are therefore, from their own very nature are complex, the simplicity of their chemical formula notwithstanding. As the complexity of these ores increase, various technologies have been developed, effecting their laboratory analysis, industrial processes and utilizations¹⁻⁴. Nonetheless, these utilization processes, including those still in the laboratory scales and desks, have created an avalanche of problems, in terms of capital cost with respect to engineering equipment, research and development, energy requirements, reagent consumption and waste management⁵.

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**Christopher Minot Weld, Clifford
Pinkney Bowie, Horace Wadsworth
Gillett, Joseph Wesley
Thompson, United States. Department
of State, Vannoy Hartrog
Manning, Albert Ebersole Rhoads**

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scholars from around the world and offer them a chance to share the latest research results in the field of Energy and Power
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technology and the science technology is growing faster and faster. In order to keep up with the daily changing situation we
have sent invitations to experts, scholars, and other people who have devoted themselves in related fields and it is a great honor to
us that most of them have accepted our invitation and supported the EPE2014 with their latest studies. Up till now we have
received over three hundred papers from various countries; this shows that there has been a growing interest in the field of
energy and power engineering. Among those papers received we have eventually chosen about a hundred to be presented and
included in this proceeding. These papers generally represented the current research status in this field and the future trend.
We sincerely believe that these papers could be valuable to the future work of yours. Finally, on behalf of the committee I
would like to deeply express our gratitude to those who have supported the EPE2014, especially the international experts who
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