Quantum Computing Philosophy In The Extraction Of Cobalt From Cobalt-Copper Complex Ore

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Abstract

Addressing todays' challenges helps in proactively solving tomorrows problems. Quantum computing is a progressive new way of performing computation to fast solve complex classical problems. This new way is based on quantum mechanics principles combined with Boolean logic. Minerals and extractive industries face complex problems involving large number of variables; with many of those variables being inter-dependants. The new approach to these problems would be the use of quantum computing as it is believed to possess a large advantage over classical computation in terms of speed of computerised simulation and optimisation. To simulate the optimisation of cobalt recovery during the acid leaching of heterogenite ore, quantum states will be used. A Co recovery greater than 70 % in leaching is represented by a logical binary state of |1> where the Co dissolution recovery less than 70% is represented by the logical binary state of |0>. Once the logical gates are designed, a circuit will be formed and calculated. This paper discusses the results obtained using both quantum and classical computation to the problem. Limitations and advantages regarding quantum computing will be discussed as well.

Keywords: Quantum computing, extraction, cobalt-copper, complex ore