The Studies of determination of grinding time on Rougher flotation on Rangin Flez copper concentration plant

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Abstract

Flotation is the most important way of sulfidic copper beneficiation and crushing is an important and inseparable part of the process. The purpose of this research is to study the effect of grinding time on Rougher Flotation of copper in Rangin Flez copper plant. Optimization this parameter is necessary to decrease the costs of operation. Crushing, and grinding is done to achieve desired grade and recovery, after study of different factors, like pH and consumption of reagents, in the existing plant conditions. And others parameters like pulp density, impeller speed, and flotation time in all of the tests have been kept constant. Results shows that the best results are produced with grinding time of 18 minutes and but better recovery is at 16 minute. Based on the condition of operations and economic of industries, 16 minute have been chosen as the best time for grinding. Also to increase the grade and recovery, suggested to use better depressants and optimize the reagents and operation parameters.

INTRODUCTION

The General practice copper processing is recovery of sulphide minerals by flotation method. Flotation as an effective process for increasing the assay, and recovery of minerals and it is industrial practice. Flotation is selective process as it can be observed from results with good grade and less gangue minerals mineral based on it, this research have been taken up to consider effect of grinding time on flotation the Rougher cells of Rangin Flez copper processing plant this is 40 kilometer away From NE of Shahrbabak in the SE of Iran that is nearby to Meiduk copper mine. The feed could be provided From Meiduk mine, it has difference mineral processing plant of copper concentration compare to Maidu concentration Factory. Lines of ore crushing, the models of crushing equipment’s, chemical reagents that are used and the type of concentration cells in this factory are the most importance different. Moazeni and et.al on 2014 in their study of Meiduk concentration plant optimized concentration assay to 2.94 and 90.8% recovery. Ghodrati and et.al at 2011, just with optimize the density of chemical materials in Flotation of Shahrbabak copper convened have arrived to 01.31% recovery.

Lime Bai and coworkers at 2012 in their studies have done on flotation of chalcopyrite they have arrived to 92% recovery. Arana and coworkers at 2010, have considered flotation of chalcopyrite with silicon hydrophobic waste and have arrived to 92.4% recovery.

SAMPLE PREPARATION

To prepare the representative sample, sampling is done in time interval with every ten minute and more than 200kg of sample have been collected. Then the sample subjected to further crushing by Jaw crusher and cone, crusher and the crushed sample have sieved on 1.4mm sieve. The product has been mixed thoroughly to homogenize, then the samples have been subjected, for refilling to get each batch of one kg with use of riffle sampler. For mineralogical studies 40 manual sample of 10 mesh size are collected and ground to 75-1000 Micron range of thin sections have been prepared for mineralogical studies with use of polarizing Dual-purpose microscope (MEIJI) have been done. Summary of mineralogy studying results is available in (1) table.

To Identify minerals in the sample and also determine amounts of metal elements and different oxide compounds available in sample, XRD and XRF analysis have done and the results are shown in (2) table.

THE EXPERIMENT CONDITIONS

To carry out flotation tests 1kg samples ground to 12,14,16,18 and 20 minute in ball mill. Experiments have done in experimental Flotation cells of 4 liter volume.

The type of reagents used and their amounts is like the condition of factory. To achieve maximum recovery, skimming have been done till that froth be loads. Concentrate, and tailings of respective flotation test are collected and dried, and weighed to determine weight percentage respective calculation have been analyzed. Some others test conditions are illustrated in 3 table.

RESULT

For each test time interval is changed, keeping other parameters constant the average of results for each time is in table 4.

The effect of grinding time on assay

In Figure1, the Fig of provided assays in terms of different times of grinding have shown.

The effect of grinding time on separation efficiency

In this study separation efficiency based on equation 1 have been calculated.