عنوان مقاله:

Copper recovery improvement by reducing the misreported copper minerals into the tailings of scavenger flotation circuit - Part II

محل انتشار:

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خلاصه مقاله:

Loss of copper minerals in the tailings of the rougher and scavenger circuits poses a significant challenge in copper processing plants, diminishing the circuit's efficiency. Part I of this paper identified the causes of copper mineral loss in the scavenger circuit tailings of the Sungun copper concentration plant, situated in northwestern Iran. Changes in feed composition, particularly the ratio of copper oxide to sulfide minerals, along with alterations in the mineralogical properties of the input feed to the scavenger circuit, emerged as pivotal factors contributing to the loss of copper minerals into the tailings. In line with these findings, the objective of the present paper (part II) is to optimize the scavenger circuit by proposing a solution to mitigate the loss of copper minerals to the tailings. Samples were collected from the feed, concentrate, and final tailings, as well as from each cell of the scavenger circuit, followed by comminution and flotation tests on each sample. The results indicate that redirecting the scavenger circuit tailings to the input of the rougher cells, owing to their higher copper grade compared to the tailings of the rougher circuit, can enhance the circuit's recovery by more than ۴%. Additionally, employing a combination of sulfide and oxide collectors, along with sulfidation to float the copper oxide minerals in the scavenger circuit, resulted in an overall recovery increase exceeding ۱۱%. Furthermore, adjusting the size of the air bubbles to capture fine copper mineral particles from the scavenger circuit cells proved to be an effective strategy for boosting recovery. Moreover, modifying the grinding circuit to liberate the minerals present in the scavenger circuit feed, predominantly the concentrate of the scavenger circuit itself, led to a recovery increase of approximately ۵%. Considering the mineralogical characteristics of the scavenger circuit feed, derived from the tailings of the cleaner cells, implementing changes in the operating conditions of the cleaner circuit—such as employing hybrid bubbles (Nano and coarse bubbles) and utilizing sulfide and oxide collectors—significantly impacted the recovery of fine copper mineral .particles and copper oxide minerals to the cleaner concentrate, thereby enhancing the scavenger circuit's performance

کلمات کلیدی:

Copper minerals, Tailings, Flotation, grinding, recovery, Scavenger circuit, Sungun