

Optimal Consume of NaOH in Starches Gelatinization for Froth Flotation

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Abstract : Starches are widely used as depressant in froth flotation operations in Brazil due to their efficiency, increasing the selectivity in the inverse flotation of quartz depressing iron ore. Starches market have been growing and improving in recent years, leading to better products attending the requirements of the mineral industry. The major source of starch used for iron ore is corn starch, which needs to be gelatinized with sodium hydroxide (NaOH) prior to use. This stage has a direct impact on industrial costs, once the lowest consumption of NaOH in gelatinization provides better control of the pH in the froth flotation and reduces the amount of electrolytes present in the pulp. In order to evaluate the gelatinization degree of different starches and flour were subjected to the addition of NaOH and temperature variation experiments. Samples of starch (corn, cassava, HIPIX 100, HIPIX 101 and HIPIX 102 commercialized by Ingredion) and flour (cassava and potato) were tested. The starch samples were characterized through Scanning Electronic Microscopy and the amylose content were determined through spectrometry, swelling and solubility tests. The gelatinization was carried out through titration with NaOH, keeping the solution temperature constant at 40 °C. At the end of the tests, the optimal amount of NaOH consumed to gelatinize the starch or flour from different botanical sources was established and a correlation between the content of amylopectin in the starch and the starch/NaOH ratio needed for its gelatinization.

Keywords : froth flotation, gelatinization, sodium hydroxide, starches and flours

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