

Aqueous Ions in Process Water and Cake Moisture during Iron Ore Filtration

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Abstract

In selective flocculation and dispersion iron ore beneficiation plants, aqueous ions from the process water concentrate within the filter cake moisture. These high concentrations of ions can lead to operational issues during downstream processes. This paper examines the ionic content of iron ore slurry before it was filtered at an operating hematite beneficiation plant and compared it to the ionic content of the moisture in the resultant filter cake. Water analyses were conducted to determine the sodium, potassium, calcium, magnesium, fluoride, chloride, nitrate, nitrite, carbonate, sulfate, and phosphate concentrations in both the filter feed slurry and filter cake moisture. Results have shown that all tested ions within the process are more concentrated within the filter cake moisture than in the filter feed slurry. This has been attributed to the physical and chemical interactions of these ions with the iron ore particle surfaces. Of these ions, phosphorus concentrates the most with the filter cake moisture content having a phosphorus content that is 24.67 times that of the filter feed slurry.