Online Instrumentation for Oil Sand Tailings Processing

Background

Online instrumentation for parameters such as Particle size distribution (PSD), clay content and bitumen content are essential to characterize the properties of oil sand tailings. The current methods used in the oil sand industry are to take a sample from a stream of tailings line and off-line measure the respective process parameters. For example, PSD is measured offline with either laser X-ray diffraction, sieve analysis or a hydrometer after bitumen is cleaned from solids. The off-line methylene blue index test is used to characterize the clay content in tailings. The online PSD measurement instrument used in the mineral processing industry was tested at the pilot scale. However, the concerns of bitumen fouling the measurement window and reliability of the instrument remain unresolved. Potassium can be measured online by monitoring the gamma emissions from K40 decay and correlated to fines content. However, the current gamma detector requires modification because the large level of background noise reduces accuracy. The online PSD, clay and bitumen content measurements of feed are critical for operating hydrocyclones in composite tailings (CT), quality control of CT, thickener operation, FFT centrifugation, in-line flocculation of FFT, feed and product quality controls in co-processing technology, etc. There is an opportunity to develop more reliable online instrumentation for real-time determination of PSD, clay content and bitumen content of feed streams in oil sand tailings processes.

Statement of Research Opportunity

The research opportunity is to develop more reliable online PSD, clay and bitumen content determination methods and tools for the oil sand tailings processes. The new methods and tools should tolerate the bitumen in oil sand tailings and provide reliable and accurate online measurements.

Desired Results

We expect developing a new method and tool for online PSD, clay and bitumen content, measurement for oil sand tailings.