

Exploring the Function and Limitation of Sodium Hydroxide as a Primary Process Aid in the Oil Sands Extraction

Xiaoli Yang*, Meng Luo, and Roger Melley

Champion Technologies, 2300 Premier Way, Sherwood Park, Alberta, Canada, T8H 2L2

In this paper, a series of the batch extraction unit (BEU) tests were designed to investigate the function and limitation of caustic application in the bitumen extraction process. As expected, caustic addition can improve bitumen recovery and froth quality for most types of ores. The solids in the froth generated in the BEU tests were characterized by the FTIR spectroscopy technology. It was found that the composition in the froth solids was various with caustic addition. Especially, the content of siderite (carbonate salts) in the froth solids were significantly increased with caustic addition. Bitumen recovery positively correlates to the content of siderite (carbonate salts) in the froth solids. A series of BEU tests were conducted to understand the impact of various clays and heavy minerals on the ore processibility by adding these fines/solids on the top of one average ore. It was found that the addition of clays, carbonate salts, and heavy minerals significantly reduce ore processibility (both bitumen recovery and froth quality). The degree of impact of their addition was various with the type of clays and minerals and the amount. Caustic was applied to see if its addition can overcome the impact of their addition. It was found that caustic can minimize the impact brought in by most of clays and minerals. However, magnesium carbonate is one that made the worst impact on ore processibility. Its addition significantly reduces bitumen recovery, and the caustic can't overcome its impact.

**Current address: Total E&P Canada Ltd. 2900, 240 - 4 Ave. SW., Calgary, Alberta, Canada, T2P 4H4*