

## **Improving Bitumen Recovery from Low Grade Oil Sands Using Novel Inorganic Polymers**

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There has been a continuous interest in chemical aids for processing Canadian oil sands by hot water extraction process since the first commercial industry operation in 1967. Several inorganic and organic chemical systems have been introduced, of which sodium hydroxide is the most widely used extraction process aid by major producers. Use of NaOH, however, results in accumulation of sodium ions in recycled water, causing higher clay dispersion and producing tailings with poor geotechnical properties that turn into mature fine tailings. This is especially true for low grade and oxidized ores, which present the greatest challenges in bitumen recovery and produce the major portion of fine tailings.

We are presenting a novel method based on use of inorganic polymers as process aids for various oil sands ores. Denver flotation cell and a laboratory scale hydrotransport loop were utilized to evaluate the effect of chemical dosage and operating parameters on the processability of high and low grade oil sands samples from the Athabasca region. Process tailings were examined for properties such as water chemistry, suspended solids, settling rate and the ease of tailing treatments. Our results demonstrate that the use of inorganic polymers during the froth process lead to a significant improvement in bitumen recovery from low grade oil sands and can improve further tailing treatments. This offers a viable solution that can be easily incorporated into current processing facilities and deliver several operational and economic benefits. Advantages in use of inorganic polymers versus sodium hydroxide are presented in details.