

## **Reducing greenhouse gas intensity from thermal processing of oil shale using the Alberta Taciuk Process (ATP) by managing carbonate decomposition**

Daniel Melo, Michael Jacob, Steven Odut

### *UMATAC Industrial Processes, Canada*

UMATAC, a company of ThyssenKrupp Polysius, provides oil shale expertise, technologies, and equipment. For almost 40 years, we have analyzed and tested oil shale ores globally. We have engineering expertise to optimize oil production, minimize CO<sub>2</sub> emissions and water consumption, and we have implemented large scale plants using the Alberta Taciuk Process (ATP) as the extraction and primary upgrading technology. The proposed Jordan Energy and Mining Limited/Karak International Oil project will use the ATP to extract shale oil from Al Lajjun oil shale, followed by hydrotreating to upgrade the shale oil to a high quality synthetic crude oil (SCO). The greenhouse gas intensity of producing this SCO is currently comparable to SCO produced from the Athabasca oil sands, and is lower than many other non-conventional fuels. Carbonate decomposition during thermal processing of the Al Lajjun ore accounts for 25% of the CO<sub>2</sub> emissions required to produce high quality SCO from this oil shale. As part of our continuous research and development program, UMATAC has carried out research on the decomposition of carbonate minerals in the Al Lajjun ore during thermal processing. UMATAC used its pyrolysis and combustion test unit to conduct a series of high-temperature experiments on the Al Lajjun oil shale. The results of these tests were complemented by analytical tests to generate a comprehensive picture of the carbonate decomposition behaviour. Carbonate decomposition under a CO<sub>2</sub> enriched atmosphere was also investigated. The research results indicate that managing carbonate decomposition of the Al Lajjun ore in the Alberta Taciuk Process offers the potential to significantly reduce CO<sub>2</sub> emissions – approaching the greenhouse gas emission intensity of conventional oil production. This presentation outlines the promising findings of this research and discusses commercial scale application and implementation in the ATP Processor.