

## **Thermal Formation Damage in Oil Sands from the Lower Cretaceous Formations in Western Canada**

*U. Romanova\**, *M. Piwowar*, *T. Ma*, *Weatherford Laboratories Canada*  
*R. Strom*, *Calgary Rock and Materials Services Inc.*

\* [uliana.romanova@weatherfordlabs.com](mailto:uliana.romanova@weatherfordlabs.com)

Western Canada holds the world's largest reserves of bitumen and the reserves are of the same order of magnitude as reserves of conventional oil in Saudi Arabia. Up to 80% of estimated reserves could be recovered by in-situ thermal recovery methods, primarily through steam injection. Oil sands deposits in Western Canada are located in the Lower Cretaceous formations such as McMurray, Wabiskaw, Clearwater and Grand Rapids.

As deposits of conventional oil and availability of better quality oil sands continue to decline, the industry is moving towards development of more challenging reservoirs, including lower quality oil sands. Both reservoir characterization and reservoir simulation data should be taken into account to make decisions about feasibility of the project and a choice of the production technology.

The paper presents low and high temperature water-oil relative permeability data for oil sands from Lower Cretaceous formations in Western Canada (with the focus on thermal formation damage). Thermal formation damage (changes in mineralogical composition and morphology of reservoir rock, porosity, air permeability and some other possible mechanisms) are discussed in regards to the depositional environment and lithological facies. Thermal formation damage and permeability impairment need to be taken into account when reservoir management decisions are made.