

Economical Method for Producing Micronized Barite Locally For Use in Drilling and Completion Fluid



THE INVENTION

This technology demonstrates a new method to upgrade and produce local Saudi barite (Fig. 1) in micronized size (1 to 5 microns) for use in drilling and completion fluids. The use of the micronized Saudi barite as a weighting additive in drilling fluids for high-pressure high temperature wells (HPHT) offers superior performance due to its more favorable rheological properties as compared to the commercial grade Barite.



Fig 1: Typical mined Barite

MARKET NEED

Barite consumption in the drilling and completion operations of deep oil and gas wells is so huge. The low cost and availability of barite compared to other weighting agents employed in for drilling fluids makes it a famous additive in oil and gas drilling applications. However, barite filter-cake removal after the drilling or completion operation is a huge problem due to low solubility of barite in the available fluids.

It is estimated that the global market for barite is US\$1.29 bn in 2015 with a CAGR of 4.10% during the period from 2016 to 2024 and it is expected to reach a worth of US\$1.85 bn by the end of 2024 [1]. In terms of volume, the barite is the most consumed oilfield mineral in Saudi Arabia [2]. China dominates the global market for barite production with 51% followed by India 14% and USA 10%.

[1] Transparent Market Research.

[2] Abdul Seedat, International Drilling Fluids and Engineering Services Ltd, 2017.

COMPETITIVE ADVANTAGE

- A cost effective method of treatment of naturally existing impure Saudi barite.
- The use of micronized Barite leads to formation of an easier to remove Barite filter-cake.
- Results in a drilling fluid and cement slurry of enhanced stability, which aids in avoiding will eliminate several drilling problems such as sagging and cement channelling.
- Yields a high compressive strength cement with negligible porosity and almost zero permeability when employed as weighting agent for cement slurry.

MARKET READINESS

Extensive laboratory testing has been conducted (sag test, solubility test, filtration test and complete suite of rheological tests) to demonstrate the superior performance of the micronized Saudi-barite over commercial barite for HPHT well applications as illustrated in Fig. 2. Evaluation of the specifications of the micronized barite against local industry standards in Saudi Arabia was also successful.

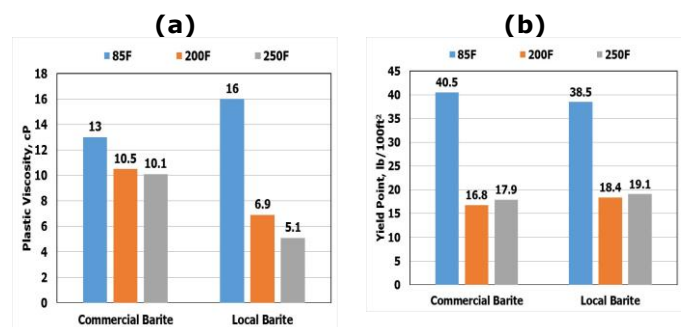


Fig 2: Change of (a) plastic viscosity, (b) yield point with temperature for local and commercial samples

NEXT STEPS

KFUPM seeks an industry partner for collaboration with regards to further development of this technology i.e. scale up of the treatment process to a an industrial capacity. In addition, an industry partner to assist in field testing of the KFUPM technology is welcomed.

PATENT PROTECTION

The invention is covered by patents US10179874, US10457855 and US10358593 owned by King Fahd University of Petroleum & Minerals (KFUPM).

ABOUT KFUPM

King Fahd University of Petroleum & Minerals is a leading educational organization for science and technology. KFUPM Innovation & Technology Transfer office is tasked with taking innovation from lab to market place.

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