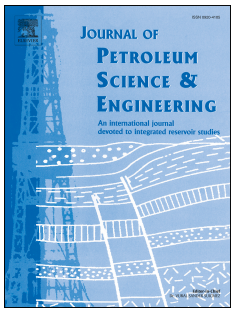
Accepted Manuscript



Experimental characterization of a new high-strength ultra-lightweight composite proppant derived from renewable resources

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PII: S0920-4105(18)30518-7

DOI: 10.1016/j.petrol.2018.06.030

Reference: PETROL 5037

To appear in: *Journal of Petroleum Science and Engineering*

Received Date: 11 January 2018

Revised Date: 23 April 2018

Accepted Date: 11 June 2018

Please cite this article as: Zoveidavianpoor, M., Gharibi, A., Zaidi bin Jaafar, M., Experimental characterization of a new high-strength ultra-lightweight composite proppant derived from renewable resources, *Journal of Petroleum Science and Engineering* (2018), doi: 10.1016/j.petrol.2018.06.030.

Experimental Characterization of a New High-Strength Ultra-Lightweight Composite Proppant Derived from Renewable Resources

Abstract

Significant improvement in strength in ultra-lightweight (ULW) proppants without sacrificing the specific weight means conductivity endurance in Hydraulic Fracturing (HF). This paper includes a study on experimental characterization of a new Chemically Modified and Reinforced Composite Proppant (CMRCP), which derived from renewable resources. The CMRCP is basically comprised of an organic substrate such as coconut shell or any other nutshells that reinforced with a natural fiber and outer coated with resin or phenolic. For characterization purpose, Microscopic Characterization (FESEM and SEM) and XRD were used to investigate the microstructure and the elements of the CMRCP, and Thermo Gravimetric Analysis (TGA) to determine the range of temperature degradation. Other characteristics envisaged are roundness and sphericity, specific gravity, bulk density, turbidity, crush resistance and fracture conductivity. The developed CMRCP shows promising results and meet the established API/ISO standards. The low specific gravity, high values of roundness and sphericity, low bulk density, low acid solubility, high crush resistance, and low turbidity of the CMRCP have qualified it for possible use as ULW proppant in HF. The results of physical tests are compared with other proppants and fracture conductivity is compared to the commonly known walnut hull-based proppant (i.e., ULW-1.25). Results show that the tolerable pressure of the CMRCP are much higher than its counterpart product.