

5<sup>th</sup> International Conference on

# Advances in Chemical Engineering & Technology

October 04-05, 2018 | London, UK

## Influence of the acid modification in clays: response of rheological parameters in based-water drilling fluids

<sup>1</sup>Susiane C Cunha, <sup>2</sup>Luiz C Bertolino and <sup>3</sup>Luciana Spinelli Ferreira<sup>1</sup>Federal University of Rio de Janeiro, Brazil<sup>2</sup>CETEM, BRAZIL<sup>3</sup>UFRJ BRAZIL

**Statement of the Problem:** Drilling fluids play an important role in petroleum wells operations. Usually these fluids are oil-based which are expensive and can cause environmental damages (SAYINDLA et al., 2017). However, this kind of fluids has a good performance to control the invasion process, avoid logging tools getting stuck and keep the diameter of the well under control (TANG et al., 2017). Therefore, there is a demand to produce environment friendly drilling fluids, water-based, and able to maintain their rheological parameters (CHEN et al., 2017). The purpose of this study is demonstrate the rheological effects of acid modifications in palygorskite and montmorillonite as components of drilling fluids.

**Methodology & Theoretical Orientation:** Four samples of clays were prepared to carry out chemical analysis. Two of them were treated with acid (HCl 1.5M in aliquots of 10.5, 14, 17.5g) (SILVA, 2011). The chemical composition of the clays, the thermal behavior and the morphology was determined by XRF, DRX and MEV. The rheological behavior of the fluids prepared was measured using the Viscosimeter FANN35°. The measured parameters were apparent and plastic viscosity (AV, PV) and yield point (YP).

**Findings:** There is a high content of pure palygorskite in the samples but high content of kaolinite when expected to be pure montmorillonite. In terms of fluid performance, the parameters AV, VP and YP were compared with API standard (API, 2001). The best fluid which meet the specified standard was the treated with acid in the aliquot of 17.5g. In this case the AV and VP parameters was within the acceptable limits but YP was above.

**Conclusion & Significance:** There is a high demand to water-based fluids however a suitable control of clay content, clay mineralogy and type of acid is still a challenge. The good results presented (non-conventional additive – palygorskite - and non-commercial montmorillonite) for AV and VP encourage new experiments.

### Recent Publications:

1. API (American Petroleum Institute), 1988. Specification for Oil-Well Drilling Fluid Materials. API Dallas, TX, 2001.
2. CHEN, Z. et al. Supercritical water oxidation of oil-based drill cuttings. Journal of Hazardous Materials, v. 332, p. 205–213, 2017.
3. SAYINDLA, S. et al. Hole-cleaning performance comparison of oil-based and water-based drilling fluids. Journal of Petroleum Science and Engineering, v. 159, n. April, p. 49–57, 2017.
4. SILVA, M. M et al. Thermal and acid activation in Green Clay, Paraiba, Brazil. Florianópolis, PTECH 2011.
5. TANG, D. K. H. et al. Factors affecting safety of processes in the Malaysian oil and gas industry. Safety Science, v. 92, p. 44–52, 2017.

### Biography

Susiane Cunha holds a bachelor's degree in Petroleum Engineering and Security Engineering. Has experience in treatment of clays with polymers and water-based drilling fluids (rheological parameters to meet petroleum wells requirements) Master's degree in polymer technology in progress.

susianescunha@gmail.com