

Accepted Manuscript

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PII: S0167-7322(18)32243-8
DOI: doi:[10.1016/j.molliq.2018.07.014](https://doi.org/10.1016/j.molliq.2018.07.014)
Reference: MOLLIQ 9335
To appear in: *Journal of Molecular Liquids*
Received date: 30 April 2018
Revised date: 2 July 2018
Accepted date: 3 July 2018

Please cite this article as: Dina Kania, Robiah Yunus, Rozita Omar, Suraya Abdul Rashid, Badrul Mohamed Jan, Niloofar Arsanjani , Nonionic polyol esters as thinner and lubricity enhancer for synthetic-based drilling fluids. Molliq (2018), doi:[10.1016/j.molliq.2018.07.014](https://doi.org/10.1016/j.molliq.2018.07.014)

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Nonionic Polyol Esters as Thinner and Lubricity Enhancer for Synthetic-Based Drilling Fluids

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Abstract

This study evaluates the performance of polyol esters as thinners and lubricity enhancers in invert emulsion synthetic-based drilling mud (SBM). Three types of polyol esters, namely pentaerythritol ester (PEE), trimethylolpropane ester (TMPE), and neopentyl glycol ester (NPGE), were prepared at various concentrations of 1, 2, and 3% (v/v) in SBM. The results showed that polyol esters reduced the rheological properties of the drilling mud, such as yield point and gel strength, after the hot rolling test at 135°C. The rheology data was fitted to the Herschel-Bulkley model to describe the shear thinning behaviour of drilling mud. The model parameters showed that the polyol ester resulted in lower yield stress of SBM, which indicated

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