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Synthesis of ester base fluids for drilling mud formulation using different catalysts

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Abstract : The catalytic properties of potassium hydrogen sulphate, molecular iodine and sulphamic acid towards the synthesis of esters of propanol and isopropanol with lauric acid were carried out at 100 and 120 °C. The most efficient catalyst at both temperatures was found to be sulphamic acid, closely followed by molecular iodine and then potassium hydrogen sulphate. Benchmarking of the products with commercially available synthetic base fluid indicated that the esters have suitable physicochemical properties for synthetic base fluid application. The results obtained from comparing the rheology of muds prepared with ester products and that with the commercially available synthetic base fluid indicate that the muds prepared with propyl and isopropyl laurate have higher electrical stability than the mud prepared with the reference base fluid. The results obtained also showed that the mud prepared with the esters synthesised in this work displayed comparable properties and performance with the mud prepared with the reference synthetic base fluid. However, isopropyl laurate (IL) formulated mud had better temperature stability than propyl laurate (PL).

Keywords : catalysts, drilling mud, ester, rheology, synthetic base fluid.

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