

ABSTRACTS

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BENEFICIATION, CHARACTERIZATION AND APPLICATION OF AKPET 1 BARITE FOR POTENTIAL USE IN DRILLING OPERATIONS

NLEKWUWA, UCHENNA PHILIPS; & DIM PAUL

Department of Chemical Engineering, Federal University of Technology
Minna, Nigeria.

Abstract

Successful drilling relies on the properties of the drilling fluid used to drill the wells. Barite serves as a weighting agent in the production of drilling fluid. Over the years, Nigeria's oil and gas industry has relied largely on imported barite for drilling operations, while the country has vast reserves of barite. There is a need to evaluate the properties of locally sourced barites for their suitability for drilling fluid production. Total reliance on foreign-produced barites has been the trend because of the oil firms in the nation establishing that the locally made barites are of low quality in chemical and physical properties and the quality is below American Petroleum Institute and Nigeria's Department of Petroleum Resources barite quality standard. Therefore, this study evaluates the best physical and chemical processes to prepare locally made barites using Akpet 1 barite ore as a case study. The characterization and XRD results of the on-site barite reads 62.101% BaSO₄, 15.423% of SiO₂, 2.201% of Fe₂O₃, 5.213% of Al₂O₃ and other soluble salts, which after a series of beneficiation processes produced barite of 91.212% BaSO₄, 1.011% SiO₂, 0.414% Fe₂O₃, 0.751% of Al₂O₃. In addition, the specific gravity is 4.39, while the Mohr's hardness scale after beneficiation is 3.25 and the pH value is 6.8. These results and the percentage increase of BaSO₄ on Akpet 1 barite demonstrate that locally-made barites can be prepared to meet the international standard for drilling oil mud formulation. The number of impurities was reduced sufficiently low, and the specific gravity of the samples improved to meet the needs of any drilling operation and compare favourably with industrially accepted barite