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Using supercritical n-pentane for the extraction and fractionation of Sudanese refinery residue**Musa A Garelnabi**

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There is no published research done on the characterization of the Sudanese Vacuum Residue (VR) in spite of its importance for refinery economics. This article represents an experimental study using n-pentane as supercritical fluid for the fractionation of residue sample taken from a Sudanese refinery. Two kilograms of the refinery residue was fractionated with n-pentane as supercritical solvent (the critical temperature of n-pentane is 469.6 K and the critical pressure, 3.37 MPa). The recirculation rate of n-pentane was set at 60 ml/min. The extraction and fractionation sections of the supercritical fluid extraction unit were maintained at 200 °C and 210 °C, respectively. The pressure of the SFEF unit was initially set at 4 MPa and was increased to 12 MPa over 8 hours. Molecular weight and specific gravity of each narrow-cut were measured and used as the group composition. The bases for selecting these two properties are that they are easily measured and readily available in public domain. The density, Conradson Carbon Residue (CCR) and SARA (Saturates, Aromatics, Resins, Asphaltene) of the sample were measured. After extraction and fractionation the fractions were further analyzed and characterized. Characteristics of supercritical fluids such as carbon dioxide, water are given. It shows the equipment used for supercritical fractionation of the crude oil where the operating pressure is regulated between 4 Mpa to 12 Mpa maximum. The temperature of the supercritical fluid is kept constant at 200 °C. The analysis and characterization of the sample and the quality of the fractions can be used by the refinery to determine the most optimum processing scheme in order to maintain peak performance by controlling the product quality fed to the downstream units.

Biography

Musa A Garelnabi is a Professor of Chemical Engineering at the Sudan University of Science and Technology, College of Petroleum Engineering and Technology, Department of Petroleum Refining and Transportation Engineering. He was the Former Dean at College of Petroleum Engineering and Water Resources, University of Peace. He is the Chemical Engineer and Manager Concorp International. He has completed his MSc in Chemical Engineering from New Mexico State University plus MBA from New Mexico State University. He is the PhD from University of Petroleum China in heavy oil processing using supercritical fluids. He has worked at Concorp International refineries in Sudan and Bakersfield California. He Owns and Manages water purification and treatment plant using Ozone.

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