

ABSTRACT

Conventionally, twenty samples of particles -rich crude oils from Osso-Platform were quantitatively fractionated into saturates, aromatics, resins, and asphaltenes (SARA) by asphaltenes precipitation in n-hexane and high performance liquid chromatography (HPLC). The newly developed and fully automated HPLC method has a sample capacity of 0.6g of crude oil. The spectroscopic probe technique captured infra red (IR). The crude oil have been characterized by vibrational spectroscopy in the infra red region. Principal component analysis(PCA) of the data sets from the IR was performed so that broad spectrum and exploratory data analysis could be conducted. Partial Least Square(PLS) regression models were built for each SARA component from IR data to predict the amount of SARA components. These models successfully fitted the experimental data from IR analysis and indicated good predictive ability for crude oil composition. The regression models from IR were not modeled properly for aromatics and asphaltenes but were properly analyzed and modeled excellently for saturates and resin components. For SARA determination, IR spectroscopy appears to be a favourable alternative to the more time- consuming fractionation method.

Keywords: Particle- rich crude oils, Vibrational spectroscopy, Principal Component Analysis, Partial Least-square(PLS) Regression Models.