ABSTRACT
A study on regeneration of naphtha reforming spent catalysts obtained from Kaduna Refinery and Petrochemical Company (KRPC) was carried out in this work. The catalysts were characterized using X-ray diffraction (XRD), X-ray fluorescence (XRF), Fourier Transform Infrared spectroscope (FTIR), and Gas Chromatograph/Mass Spectrometer (GC/MS). The deactivated catalyst samples were calcined at different temperature, air pressure and time to obtain optimum regeneration condition with the addition of dichloropropane to boost the activity of the catalysts. Optimum regeneration temperature, air pressure and time (500°C, 1.002 atm, and 4 hours respectively) were obtained via gravimetric method. The catalytic performance of the catalysts were determined for fresh, deactivated and regenerated catalysts using treated heavy naphtha as substrate at 465°C reactor temperature at atmospheric pressure. It was found that the fresh catalyst has the highest yield of reformate (84.24%) produce, while a reformate sample from KRPC immediately after a turnaround regeneration exercise has 82.44% yield and that of the deactivated catalysts dropped to 60.47% and 77.74% due to the presence of carbonaceous material deposited on them, after regeneration the percentage reformate yield increased to 76.65% and 83.86% of regenerated deactivated catalyst A and B respectively. The results showed a significant improvement in the reformate yield after the regeneration of the spent catalyst. The reformate obtained from the regenerated catalyst contains more of iso-paraffins, which are useful for gasoline blend.