

Effect of Rice Husk Filler on the Structural and Dielectric Properties of Palm Oil as an Electrical Insulation Material

ABSTRACT

This study uses natural fibre, which is moisture absorbent, as an innovative and economical filler for insulating oil. Rice husk (RH) is a natural fibre known to have water-absorbing properties and used as a supplementary cementitious material. This research utilises the water-absorbing properties of RH to improve the physicochemical and dielectric properties of insulating oil. RH was refined into a fine powder at a diameter of less than 63 μm . Palm oil (PO) was synthesised with RH at concentrations of 0 g/L, 0.01 g/L, and 0.1 g/L. The moisture-absorbent properties of RH were analysed by using Fourier-transform infrared (FTIR) spectroscopy. The particle size and distribution of RH in PO were also obtained using a scanning electron microscope (SEM) and a Zeta particle analyser. The breakdown voltage (BDV) strength of PO with RH was measured according to IEC 60156, and the dielectric frequency response was investigated in the range of 10^2 – 10^5 Hz. RH is proven to absorb moisture from PO, as the O–H band intensity at the 3350 cm^{-1} is increased from the experimental results. Therefore, the mean BDV and dielectric insulation properties of PO dispersed with RH also increased accordingly.