

Effects of nanosilica and nanotitania on partial discharge characteristics of natural rubber-llDpe blends as high voltage insulation material

Abstract

Polymeric materials are widely used in power apparatus as electrical insulation especially as high voltage cable insulation. Meanwhile, partial discharge (PD) has always been a predecessor to major faults and problem in this field. Recent works showed that combination of natural rubber and polyethylene produces a good match of composite for electrical insulation. In this paper, blends of natural rubber, polymeric-based material of linear-low density polyethylene (LLDPE), nano-sized fillers of silica (SiO₂) and titania (TiO₂) were prepared by extrusion machine and moulding process. PD tests were carried out on each sample based on CIGRE Method II technique for 3 hours of ageing time. DAQ software was used as a tool to analyse the PD data, which measures PD pulse magnitude and number of PD occurrence. In addition, SEM images and percentage of element from EDX of the samples were taken before and after experiencing high voltage stress. The results revealed that there is a correlation between amount of filler and discharge activities.