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The effect of semi-conductive and non-conductive nano particles in sunflower oil based insulation

Abstract

Following the improvement of technology, more and more alternatives are introduced to improve the insulation material and one of them is the nanotechnology. Research had been done which confirm the enhancement of the transformer oil upon adding nanoparticles in term of dielectric strength, viscosity, relative permittivity and others. In this research, semi-conductive (ZnO) and non-conductive (ZrO_2) nanoparticles with weigh to volume ratio of 0.05g/l are added to the sunflower oil based insulation and the effects are observed. The relative permittivity of added ZnO is higher compare to ZrO_2 in mineral oil. The situation is opposite as ZrO2 yield higher permittivity with sunflower oil. In term of breakdown voltage, the addition of ZnO shows a better dielectric strength compare to ZrO_2. The kinematic viscosity is also increase when both nanoparticles are added in which ZnO contributes a higher value.