Dielectric properties of transformer paper impregnated by mineral oil based magnetic fluid

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The influence of combined magnetic and electric field on permittivity of transformer paper used in power transformers was observed. Transformer paper was impregnated by pure transformer oil ITO 100 and magnetic fluids based on transformer oil ITO 100 with different concentrations of magnetite nanoparticles. The measurements were carried out with help of high precision capacitance bridge. The electric intensity between circular planar electrodes was in the region of weak electric field (E < 10.E6 V/m). The increase of electric permittivity of transformer paper impregnated by magnetic fluid opposite pure transformer paper was observed. The experiments showed that permittivity of insulator system consisting of pure transformer paper and impregnated transformer paper naturally depends on number of paper layers. The magnetodielectric effect was found to be dependent on magnetite nanoparticles concentration in magnetic fluids and it increases with the increase of magnetite nanoparticles concentration.

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