

ABSTRACT

Transformer oil is an insulating liquid placed in a transformer tank that functions as a cooling medium and insulator. Research has been conducted on the electrooptical properties of transformer oil with the light polarization method. This study aims to analyze the effect of electric voltage, the length of time heating the transformer oil and laser wavelength on changes in the polarization angle of transformer oil. Samples of transformer oil were heated with varying lengths of heating time of 0 hours, 3 hours, 6 hours, 9 hours, 12 hours, and 15 hours. The study was conducted using green laser $\lambda = 532$ nm, red laser $\lambda = 650$ nm, and purple laser $\lambda = 407$ nm. The amount of electric voltage provided gradually from 0 kV to 9 kV. The results of the study influenced by electric voltage indicate that the transformer oil has non-linear optical properties with changes in the electro-optical polarization angle being quadratic with a linear coefficient of 0,0112 and a quadratic coefficient of 0,0055 in all conditions. The longer the sample heating time, the greater the change in the electro-optical polarization angle indicating relative quality degradation with a linear coefficient of 0,0442 and a quadratic coefficient of 0,0006 in all conditions. The same results apply to all wavelengths under experimental conditions in the study. This method is quite significant as a rational method for testing the quality of transformer oil.

Keywords: *electrooptical polarization, polarization angle change, transformer oil*