

**TEMPERATURE EFFECT ON THE STRUCTURE OF  
TRANSFORMER OIL BASED MAGNETIC LIQUIDS USING  
ACOUSTIC SPECTROSCOPY.**

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The changes in structural arrangement in a magnetic fluid upon the effect of an external magnetic field and temperature were studied by acoustic spectroscopy. The properties of magnetic fluid dispersed in transformer oil TECHNOL have been studied by the analysis of changes in the acoustic wave absorption coefficient. The absorption coefficient of acoustic waves was measured as a function of an external magnetic field in the range of 0 – 200 *mT*, parallel to the direction of the field and as a function of temperature of 15 – 35 °C for various magnetic nanoparticles concentrations. The strong influence of the steeped magnetic field on the acoustic wave absorption coefficient was detected and its hysteresis was detected, too. When a magnetic field is swept at a constant rate, the dominant interactions between the external magnetic field and the magnetic moment of the nanoparticle occur, leading to the aggregation of magnetic nanoparticles and clusters formation. However, the temperature of magnetic fluids has very important influence on the obtained dependencies, where the mechanism of thermal motion acts against the cluster creation. The obtained dependencies of magnetic field and temperature on the investigated magnetic liquids structure are discussed.

9.7 cm

13.4 cm

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