Optimization and Simulation of MEMS Based Thermal Sensor for Performance of Transformer Oil

V. Vijayalakshmi[1], K.C. Devi[1]

[1]PSG College of Technology, Coimbatore, Tamil Nadu, India

Abstract

In this work, a bimetallic strip based thermal sensor was designed using MEMS module of COMSOL Multiphysics® software to monitor the temperature rise in insulating oil which was used as coolant in transformers. The bimetallic strip was designed with different shapes such as cylindrical, rectangle, square & conical and different compositions such as Al/Steel Alloy and Fe/Cu which can withstand high temperatures to evaluate the performance of the sensor. In transformers, insulating oil is used to absorb the heat dissipated from coils namely primary and secondary coils. During the operation, there is a rise in temperature of oil beyond certain limit so there is a need for replacement of oil since it loses its insulating property and leads to firing of transformer. In order to avoid this problem, there is a need for a thermal sensor which can measure temperature change in oil inside the transformer. This work will demonstrate the best performed material and shape for efficient sensing of temperature in the transformer oil.