Abstract

In this work is presented a thermal and vibration modeling that allows the design of high-thermal conductivity, mechanical isolating capsules for inserting Fiber Bragg Gratings (FBG) based temperature sensors for applications on electric power systems (EPS). One of the most relevant variables in EPS component operation is temperature, because its real time monitoring allows predicting the state of the system and generating predictive maintenance actions that guarantee quality and continuity in its service. The modeling of the dielectric capsule is divided in two fundamental parts: i) a mechanical analysis using the finite element method for establishing the capsule response to vibrations in the regime reported in literature for generators and power transformers; ii) a thermal analysis using an analytical model that allows to establish the sensor's response speed due to temperature changes. The results that were found show a great potential on the material proposed for the fabrication of the capsule, which is not reported in this kind of applications.

Keywords

Dielectric capsule, Fiber Bragg grating, Power electric system, Thermal measuring.