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Design and Develop of a Passive LC Resonator for Wireless Measurement During the Curing Process.

ABSTRACT - Masterthesis

Interdigital sensor (IDS) is a digit-like or finger-like periodic pattern of parallel in-plane electrodes to build up the capacitance associated with electric fields that penetrate into a material sample. Dielectric properties change dramatically during the curing process of thermostat resin matrix composite materials when resin transforms from monomer liquid into a cross-linked insoluble solid material. The cure application of the IDS is to monitor the dielectric properties of thermostat resin during curing process.

Wiring is sometimes difficult for measurements and electronic circuitry may not sustain high temperature and pressure (up to 200°C and 8 bar). Therefore in this master thesis a chipless inductor-capacitor (LC) circuit is designed where the capacitance is an interdigital sensor for wireless measurements. The system consists of planar inductor-capacitor resonator operating wireless through inductive coupling with a reader circuit. Change in the capacitance will result in a shifting of resonant frequency.

The aim of this thesis is to design a passive LC-resonator and measure a shift in resonance frequency during curing process. To read out the circuit, an inductive coupled reader should also be designed. Both designs should build up by Microsystem-technology using Laser Lithography. Capability of monitoring a curing process of a polymer using this system should be evaluated.