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# Sensor Development and Degradation Effects for Acousto Ultrasonic Applications Using FEM Simulations

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A novel sensor package which consists of LTCC (low temperature cofired ceramics) and an enclosed PZT piezo ceramic disc is studied in principal behaviour for use in Acousto Ultrasonic applications. Using the piezoelectric effect the package generates lamb waves in a base substrate. In the present work, the package is assembled on a thin aluminium plate, since the isotropic material behaviour eases the analysis. Frequency ranges from 50 kHz up to 400 kHz are used, which excites symmetrical and asymmetrical modes lowest order in the aluminium plate. The FEM-model of the package has been calibrated in order to ensure correct physical behaviour of the simulation using analytical solutions of lamb wave propagation and experimental data. The calibration of the FEM-model is the prerequisite for further investigations. The principle of wave propagation based on the sensor package configuration is studied and effects resulting of the package shape and construction are determined. Also, influences of the adhesive layer between ceramic package and the aluminium plate are determined in case of a debonding progress.

**Ключевые слова:**

**Содержание.**

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