

15th International Conference and Exhibition on

MATERIALS SCIENCE AND ENGINEERING

&

3rd International Conference on

APPLIED CRYSTALLOGRAPHY

November 07-08, 2018 | Atlanta, USA

Modelling and simulation sensors of mems based pressure for industrial applications

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This paper presents investigations on improvement sensitivity of MEMS-based pressure sensor for various industrial and environmental applications. It provides an overview of the design, modeling and simulation of MEMS pressure sensor. An attempt has been made to achieve high sensitivity i.e. providing different structures for membrane (circular, square, rectangle) with uniform surface area and thickness have been modeled and simulated for various loads ranging from 0.1 to 1MPa with three different materials. From the analysis of simulation results, it has been observed that the pressure sensor with circular membrane provided with aluminium material found to exhibit more deformation and high sensitivity of 28.2×10^{-6} for $10 \mu\text{m}$ thickness and 45.6×10^{-6} for $7 \mu\text{m}$ thickness. The reasons for enhancement in the sensitivity discussed in detail as a function of input load, geometry changes and materials addition. The software tool COMSOL Multiphysics version 4.2 is used to model the proposed design of pressure sensor. These studies are highly useful to check and compute pressure in various environmental conditions.

Biography

Vemireddy Hanumakoti graduated from Department of Electronics and Instrumentation Engineering at Lakireddy Bali Reddy Autonomous Engineering College. She is working as a Technician in the Department of Electronics and Instrumentation Engineering in National MEMS Design Centre (NMDC) since five years. She is involving and clarifying the doubts that are coming to NMDC for design and simulation by using software tool COMSOL Multiphysics. She is actively participating in department organizing conferences, workshops and seminars related to NMDC.

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