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LC capacitive pressure sensors with micropillar support for improved reliability

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Abstract

The concept of blood circulation in the human body is interesting, and the main pumping source of blood flow is the heart, which can pump out 5 L/min of blood [1]. A major cause of cardiovascular disease is atherosclerosis, where blood flow is restricted, potentially resulting in sudden heart attacks. Monitoring blood pressure in the heart's blood vessels is a complicated process, and a well-elaborated sensor could detect issues at an early stage. Various types of wireless sensors have been fabricated and tested in the preclinical stage to detect pressure within blood vessels. However, many of them struggle to function in harsh environments such as blood and exhibit reduced sensitivity [2]. An intriguing area for further development is improving the performance of LC capacitive sensors by integrating them with polymer stents. In this work, we have developed photosensitive polymer-based LC-type pressure sensors with supporting micropillars positioned in the center of the capacitor plates to enable stable monitoring of blood vessel pressure. Specifically designed supporting micropillars were set at 10 percent of the initial capacitor diameter and were characterized for their performance in different capacitor diameters. The results were compared to those obtained in the absence of supporting micropillars. The obtained results show that the presence of the supporting pattern improves the reliability of capacitive pressure sensors, while the absence of the supporting pillar results in slightly higher sensitivity.

Top of Form

Keywords: LC sensor, Pressure sensor, Wireless, Polymer stent,

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References

[1] Chaya Gopalan, Erik Kirk, *Biology of Cardiovascular and Metabolic Diseases*. Academic Press, 2022.

[2] N. E. Oyunbaatar, D. S. Kim, G. Prasad, Y. J. Jeong, and D. W. Lee, "Self-rollable Polymer Stent Integrated with Wireless Pressure Sensor for Real-time Monitoring of Cardiovascular Pressure." *Sens. Actuators A: Phys.*, Vol. 346 p. 113869, 2022.