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Polyurethane composite based force controlled micro sensors for biomedical applications

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Polymers and its nanocomposites keep on serving as a basic solution for the developing electronic technologies. Their wider applicable ranges were through consumer electronics, photovoltaics, e-clothing, robotics and biotechnology. The requirement of electronically active systems composed of biomaterials has utmost significance. The present work uses polyurethane filled polymer nanocomposites for designing a flexible force sensor useful in biomedical applications. The device sensitivity and specificity are analyzed by varying different environmental conditions. It is observed that reproducible and constant signals are observed upon force. The sensor mechanism involves in the polymer network capacitance and resistance change. The interface of zinc oxide is checked for the effective interactions existing and the morphology of the composites are analyzed in detail to know the nanostructural architects. We have also analyzed the sensing effect with biomedical implants to grasp. Finally, the investigated sensitivity of the developed eco-friendly, low-cost sensor of reduced size demonstrates its capability to resolve many of the technological problems facing on sensing devices for biomedical applications. This sensor can be used in robotic systems for minimally invasive surgeries (MIS), precise surgeries, and their corresponding technologies.

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