National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Development of Graphene-Based Multi-Modal Piezoresistive Sensors for Human Health and Fruit Growth Monitoring
Speaker	: Ravi Prakash Verma (Rollno : 518ch1004)
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Venue	: Meeting Hall, Department of Chemical Engineering (Hybrid Mode)
Date and Time	: 07 Jun 2024 (4.00 PM)
Abstract	:

The modern world requires a modern health monitoring approach, which necessitates the requirement of smart wearable devices. Flexible strain sensors have potential applications in wearable sensors, smart farming, robotics, human-machine interfaces, etc. Strain sensors fabricated using conventional materials such as silicon and metal oxides have limited sensitivity and stretchability. However, monitoring physical activities and physiological signals requires highly sensitive and stretchable strain sensors. This work has demonstrated several facile methods of sensor fabrication using various flexible and sensing materials. Initially, reduced graphene oxide (rGO), multilayer graphene (MLG), and few-layer graphene (FLG) have been synthesized using the electrochemical exfoliation method, and their properties have been investigated. Using the synthesized rGO, MLG, and FLG, various strain sensors, including rGO-sealant, E-bandage, and hydrophobic strain sensors, have been developed. The fabricated sensors exhibited ultra-sensitivity (GF) of 4000-18330, stretchability of 35-125%, and durability of 4500-50000 cycles. Utilizing the ultra-sensitivity and high stretchability of the sensors, the fabricated sensors have been used for the real-time monitoring of human activities, orthopedic joint movements, stem movement, and physiology using the Internet of Things (IoT). Further, the continuous real-time fruit growth has been monitored using fabricated sensors.

Keywords: Strain sensor, Reduced graphene oxide, Wearable electronics, Internet of things,

All are Cordially Welcome.