National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Development of Non-Enzymatic Electrochemical Sensor Materials for Detection of Biomarkers
Speaker	: Prakash Kumar (Rollno : 522ch1006)
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Venue	: New Seminar hall, Chemical Engineering Department, NIT Rourkela
Date and Time	: 28 Mar 2025 (11:00 AM)
Abstract	: Biomarkers play a crucial role in disease diagnosis, prognosis, and treatment monitoring. This study focuses on developing non-enzymatic electrochemical sensors for the detection of glucose. It explores nickel-based electrodes, comparing Nickel Flag Electrode (NFE), Nickel Wire Electrode (NWE), and Nickel-Graphene-Carbon (NiGC/GCE) composite electrodes. The NFE sensor exhibited high sensitivity (9650 &muAmM^{-1}cm^{-2}) with a 100 &muM detection limit, while the NWE sensor showed lower sensitivity (1460 &muAmM^{-1}cm^{-2}) with detection limit (0.5 &muM). The NiGC/GCE sensor, leveraging graphene/carbon synergy, achieved exceptional sensitivity (8890 &muAmM^{-1}cm^{-2}) and a 0.17 &muM detection limit. Electrochemical analyses confirmed strong stability and selectivity. The NiGC/GCE sensors superior performance highlights its potential for miniaturized, cost-effective glucose monitoring. These findings promote Ni-based sensors as viable alternatives to noble metals, advancing affordable and scalable diabetes management solutions.