

Title (7)	:	Highly Efficient Nonenzymatic Electrochemical Sensor for COD Measurement using ZnO/rGO
Journal	:	Malaysian Journal of Chemistry
Document Type	:	Article
Publisher	:	MJChem
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Link to Full Text	:	https://ikm.org.my/publications/malaysian-journal-of-chemistry/view-abstract.php?abs=J0050-0023127
Link to Scopus Preview	:	https://www.scopus.com/inward/record.uri?eid=2-s2.0-85197367835&doi=10.55373%2fmjchem.v26i3.151&partnerID=40&md5=6defccc8643f6892be639b26ee225dd3
Abstract	:	This study presents the production and comparative analysis of electrochemical sensors designed for swift assessment of Chemical Oxygen Demand (COD) in lake water samples. Utilizing the hydrothermal method, Zinc Oxide/reduced Graphene Oxide (ZnO/rGO) nanocomposites were effectively synthesized. Examination of the X-ray Diffraction (XRD) patterns of the ZnO1/rGO1 nanocomposites illustrates the presence of hexagonal phase ZnO with a wurtzite structure. Field Emission Scanning Electron Microscopy (FESEM) images depict the integration of ZnO nanoparticles onto the rGO sheets. The Brunauer–Emmett–Teller (BET) analysis indicates a substantial increase in surface area and pore volume due to the presence of rGO, facilitating the unhindered movement of glucose and real lake water samples. Thermogravimetric Analysis (TGA) demonstrates the thermal durability of the synthesized electrode. Initially, sensor responses were assessed using glycerol as a standard analyte, followed by analysis of real lake water samples from the vicinity of Bandar Baru Bangi. The COD values obtained from the samples were compared against the standard dichromate method. Notably, the electrode crafted with the ZnO1/rGO1 nanocomposite exhibited superior electrochemical performance, with COD values closely aligning with those derived from the standard method within 95% confidence intervals...see more.