

NOVEL CORROSION SENSOR BASED ON CARBON NANOTUBE COMPOSITES FOR STRUCTURAL HEALTH MONITORING

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SUMMARY: Bridges are important infrastructures of all nations and are required for transportation of goods as well as human. A catastrophic failure can result in loss of lives and enormous financial hardship to the nation. Hence, there is an urgent need to monitor our infrastructures to prolong their life span, at the same time catering for heavier and faster moving traffics. Although various kinds of sensors are now available to monitor the health of the structures due to corrosion, they do not provide permanent and long term measurements. This paper investigates the fabrication of Carbon Nanotube (CNT) based composite sensors for structural health monitoring. The CNTs, a key material in nanotechnology has aroused great interest in the research community due to their remarkable mechanical, electrochemical, piezoresistive and other physical properties. Multi-wall CNT (MWCNT)/Nafion composite sensors were fabricated to evaluate their electrical properties when subjected to chemical solutions, to simulate a chemical reaction due to corrosion and real life corrosion experimental tests. The electrical resistance of the sensor electrode was dramatically changed due to corrosion. The novel sensor is expected to effectively detect corrosion in structures based on the measurement of electrical impedances of the CNT composite.