# Fabrication of Carbon Nanosphere-Based Gas Sensor

Perez-Gordillo, Jose

Carbon Nanospheres (CNS) are important for electronic, environmental and medical applications. Modern gas sensors utilize harmful materials. This investigation's objective was to fabricate a gas sensor utilizing the CNS synthesized from sucrose. Can an effective, green and low-cost CNS gas sensor be made from sucrose? The hypothesis proposes that CNS synthesized from sucrose will be effective as a gas sensor. CNS were prepared by the hydro thermal carbonization of sucrose. An aqueous sucrose solution (0.1M) was heated at 200°C to produce the spheres. The spheres were annealed at 800°C in a nitrogen flow to reduce oxygen content and electrical resistance. The sensor was prepared by mixing equal amounts of CNS and the insulating polymer, polyethylene oxide. The dried paste was deposited over a silicon substrate with a silicon oxide layer and gold electrodes. The CNS with PEO sample was put inside a gas sensing chamber. A constant voltage of 0.1V was applied across the sample and the electrical current was measured as a function of time while a gas was applied to the chamber. Nitrogen and different alcohol gases were switched every 200 seconds. The process was repeated for at least five cycles. The change in conductance was affected by the gas flow and this was plotted as a function of time. The gas flow was maintained at 350 mL/min. The hypothesis was accepted because the gas sensor was effective. The sensor could also discern between alliphatic gases such as methanol, ethanol and 1-propanol given the difference in sensitivity of each gas.

**Awards Won:**