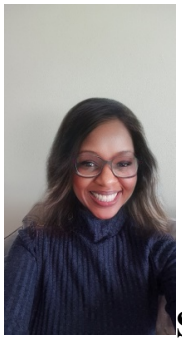

Synthesis and fabrication and testing of nanostructured Indium Oxide displaying improved gas sensing capabilities for food safety

A number of selected devices have been demonstrated to be able to monitor external or internal changes in the food product's environment. However, gas sensors displaying high sensitivity, selectivity and stability can produce highly amplified signals and this will enable detection of low concentrations of target analytes released by decomposing food products. Gas sensors based on nanostructured semiconductor metal oxides has emerged as a unique gas sensor type amongst other gas sensors due to their low production cost and miniaturization, ease of fabrication, simple operation, and convenient detection and sensitivity. Since their discovery as good sensing materials, semiconductor metal oxides have been extensively studied and more research has been dedicated into their growth and improvement for gas sensing applications. Indium oxide (In_2O_3) in particular, is one of the semiconductor metal oxides that reveals n-type conductivity having a wide band gap of 3.55 eV-3.75 eV and high chemical inertness. These excellent properties make it a promising gas sensing material for detection of low concentrations of volatile organic compounds in fruits and vegetables including ethylene, ethanol, acetone and methanol. This project focuses on synthesis and design of pure and functionalized In_2O_3-based gas sensors with the aim of investigating the effect of microstructural variation on their sensing behaviour under specific working conditions of fruits and vegetables.