GOLD NANOPARTICLES EMBEDDED SILICON CHANNEL BIOSENSORS FOR IMPROVED SENSITIVITY

INTRODUCTION
This project presents the fabrication steps of biosensors device on Silicon-On-Insulator (SOI), embedded with gold nanoparticles (GNPs) to enhance the sensitivity of the detection. Conventional photolithography technique is used to fabricate the device. Surface morphology of the fabricated device is characterized using Scanning Electron Microscope (SEM) and Atomic Force Microscope (AFM) and followed by current-voltage characteristic using source meter. The electrical behavior of the fabricated device is compared for the device with or without gold nanoparticles. By incorporating the gold nanoparticles, it boosts up the signal and enhance the sensitivity of the device.

NOVELTY
• Ultra-sensitive and selective
• Label-free detection

INNOVATION AND SCIENTIFIC VALUE
• Fast detection
• Quantitative
• Accurate

COMMERCIALISATION
• Portable
• Compatible with existing fabrication process

RESULT

DEVICE FABRICATION PROCESS FLOW

DEMOGRAPHIC CHARACTERIZATION

Figure 5: Surface modification using gold nanoparticles (GNPs)

Figure 2: Wire formation
Figure 3: Electrode formation
Figure 4: GNPs formation

Figure 6: AFM Characterization
Figure 7: SEM Characterization
Figure 8: SEM image with gold nanoparticles

Figure 1: Source: Researchers