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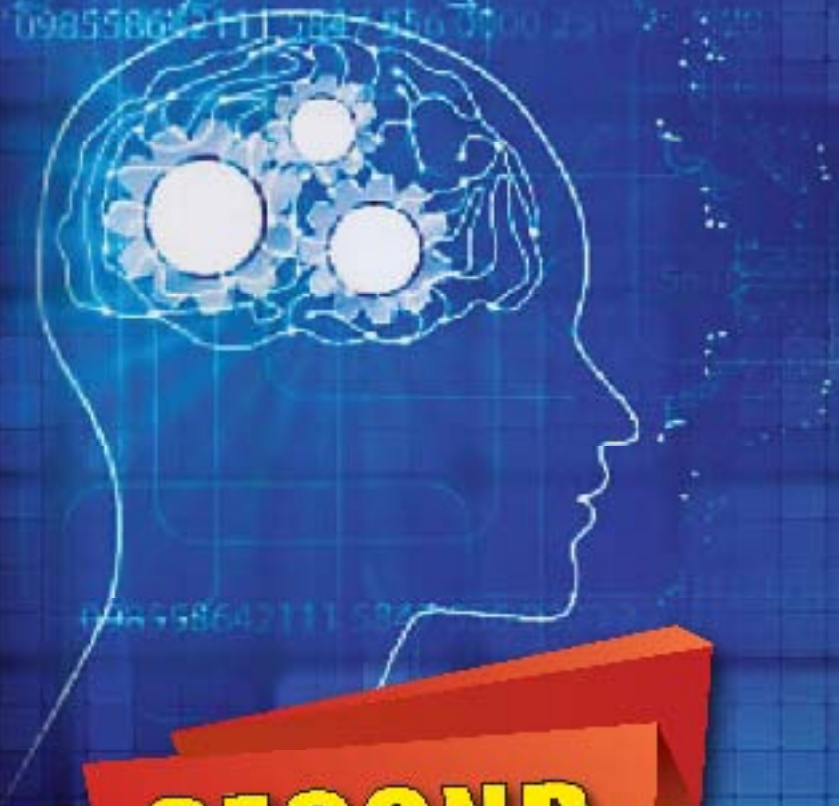

SECOND ISSUE

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5

Name : **Salina Bt Muhamad**

Title : **Schottky Behavior of Novel Synthesized Aligned Zinc Oxide Nanorod Arrays and Aligned Carbon Nanotube Arrays for Mesfet Device**

Faculty : **Electrical Engineering**

Supervisor : **Prof. Dr. Mohamad Rusop Mahmood** (MS)

Profesor Dr Zaki Awang (CS)

Profesor Dr Anuar Ahmad (CS)

This study is carried out to introduce new active layers in a Schottky diode for a metal-semiconductor field effect transistor (MESFET) device structure, which are novel aligned zinc oxide (ZnO) nanorod arrays and aligned carbon nanotubes (CNT) arrays. Both nanomaterials are successfully synthesized using the Chemical Bath Deposition (CBD) and Chemical Vapor Deposition (CVD) methods, respectively, which in nanoscale, exhibit 1-dimensional structure and quantum confinement effects that lead to better properties. Prior to the synthesis process, the novel seed layer, which is the Mg0.3Zn0.7O thin film, is introduced. In order to obtain a well-aligned and densely-packed ZnO nanorod arrays, parametric studies are conducted during the deposition process where the optimized parameters are finalized (substrate at top floating position, 4 hour deposition time, and molarities of 0.05 M or more). Further investigations reveal that the 0.1 M sample was the most conductive sample of 27.75 Scm-1 with the highest crystallinity, which then becomes the standard parameter to be applied in the Schottky diode. Then, the possible growth mechanism is proposed. Schottky behavior is observed in all samples with Au-, Ag- and Pt-gate contact where the highest barrier height of 0.77 eV and reasonable ideality factor are obtained from the Au/0.1 M aligned ZnO nanorod arrays/Mg0.3Zn0.7O. Applying this into the MESFET device structure, a common MESFET behavior is then obtained. This strongly indicates that the proposed new active nanomaterial, which is novel aligned ZnO nanorod arrays/Mg0.3Zn0.7O, is applicable in the MESFET device structure application, even though it exhibits a channel length modulation phenomenon. Simultaneously, the aligned CNT arrays are successfully grown on the Mg0.3Zn0.7O seed layer by a palm oil precursor mixed ferrocene. The existence of Mg and Zn in the seed layer increases the catalytic activity which results in physical and electrical improvement, where a conductivity of more than 100 kScm-1 is obtained. However, only weak Schottky-curves are obtained, leading to intolerable application in the MESFET device structure.