NS-007 **<Invited Speaker>**

New Graphene Electronic Device Structure for High Ion/Ioff Ratio

정현종

삼성종합기술원

Graphene has been considered as one of the potential post Si-materials due to its high mobility. [1] However, since graphene is semi-conductor with zero band gap, it is difficult to achieve high Ion/Ioff ratio, one of the most important requirements for commercial devices. There have been many attempts to open its band gap for high Ion/Ioff ratio, but most of them end up lowering the mobility. [2-5] Thus, we proposed and demonstrated a new device structure for graphene transistor based on one of the unique properties of graphene for high Ion/Ioff: using this approach, we were able to achieve the ratio over 10^5. [6] Our device has several major advantages over previously proposed graphene based electronic devices. Since our device does not alter the given properties of graphene, such as opening the band gap, it has no fundamental issues on mobility degradations. In addition, our device is fully compatible with current Si technology and we were able to fabricate the devices with 6 inch wafer scale with CVD (Chemical Vapor Deposition) grown graphene. In this presentation, we will discuss about the details of our graphene device including the device structure and the detailed understanding of working mechanism. We will present device characteristics including I-V curves with 10^5 on/off ratio. We will also present the performance of an inverter based on our devices. Finally, we will discuss the current issues and their potential solutions.

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