TWF2-04

금속 접합을 이용한 쇼트키 트랜지스터 및 쇼트키 단전자 트랜지스터의 특성

장문규

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Schottky barrier metal-oxide-semiconductor field-effect transistors (SB-MOSFETs) can be made by replacing the impurity doped source and drain regions of MOSFETs with silicides. The structure is quite simple and the ultra-shallow junction can be formed easily and accurately with very low parasitic source and drain resistance. However, the major drawback was the low current drivability in *n*-type SB-MOSFETs due to the high Schottky barrier height. In this talk, various sizes of erbium/platinum silicided *n/p*-type SB-MOSFETs are manufactured from 20um to 7nm. The manufactured SB-MOSFETs show excellent DIBL and subthreshold swing (SS) characteristics due to the existence of Schottky barrier between source and channel. It is found that the minimization of trap density between silicide and silicon interface and the reduction of the underlap resistance are the key factors for the improvement of short channel characteristics. The manufactured 10nm *n*-type SB-MOSFET showed 550uA/um saturation current at V_{GS}-V_T=V_{DS}=2V condition (T_{ox}=5nm) with excellent short channel characteristics.

Aslo, we will discuss on the single electron transistor characteristics from the manufactured SB-MOSFETs, for the first time. Thus, SB-MOSFETs can work as the conventional MOSFETs and as SETs depending on the operation conditions.