P-type field effect transistor based on Na-doped BaSnO$_3$ YEAJU JANG, SUNGYUN HONG, JISUNG PARK, KOOKRIN CHAR, Seoul Natl Univ —

We fabricated field effect transistors (FET) based on the p-type Na-doped BaSnO$_3$ (BNSO) channel layer. The properties of epitaxial BNSO channel layer were controlled by the doping rate. In order to modulate the p-type FET, we used amorphous HfO$_x$ and epitaxial BaHfO$_3$ (BHO) gate oxides, both of which have high dielectric constants. HfO$_x$ was deposited by atomic-layer-deposition and BHO was epitaxially grown by pulsed laser deposition. The pulsed laser deposited SrRuO$_3$ (SRO) was used as the source and the drain contacts. Indium-tin oxide and La-doped BaSnO$_3$ were used as the gate electrodes on top of the HfO$_x$ and the BHO gate oxides, respectively. We will analyze and present the performances of the BNSO field effect transistor such as the $I_{DS}$-$V_{DS}$, the $I_{DS}$-$V_{GS}$, the $I_{on}/I_{off}$ ratio, and the field effect mobility.

$^1$Samsung Science and Technology Foundation

Yeaju Jang
Seoul Natl Univ

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