

# SURFACE PASSIVATION EFFECT IN SGOI NANOWIRE BIOSENSOR WITH HIGH GE FRACTION

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## Abstract

The increase of surface to volume ratio results in the enhancement of the sensitivity of the nanowires. Our previous studies have shown that the higher Ge fraction of  $\text{Si}_{1-x}\text{Ge}_x$  nano-wire improves the sensitivity of the nanowire biosensor as a result of carrier mobility enhancement in strain-Si. Increasing the fraction of Ge in SiGe-on-Insulator (SGOI) using Ge condensation by oxidation has obtained a significant enhancement in hole mobility, further improving the sensitivity of SGOI nanowire. However, the sensitivity of SGOI nanowire was degraded for exceeding a Ge fraction of 20% (i.e., high Ge fraction), resulting from the unstable surface state. In this work, a top surface passivation  $\text{SiO}_2$  layer was deposited on  $\text{Si}_{0.8}\text{Ge}_{0.2}$  nanowire and the sensitivity was about 1.3 times greater than nanowire sample without the top passivation layer.

Keyword : SiGe-on-insulator, Biosensor, Passivation, Sensitivity.