The SiGe based metal-semiconductor-metal photodetectors (MSM-PDs) has been fabricated in this work, in which the Si$_{0.8}$Ge$_{0.2}$ layer is grown onto n-Si substrate by ultra-high-vacuum chemical-vapor-deposition (UHV-CVD) system. In our structure, a thin hydrogenated intrinsic amorphous silicon (i-a-Si:H) layer is processed onto SiGe surface to suppress the dark current of this structure. The i-a-Si:H layer is deposited by using plasma-enhanced chemical-vapor-deposition (PECVD) system. The MSM-PDs without a thin i-a-Si:H one have a high dark current of $6.58 \times 10^{-3}$A at a bias voltage of 10 V, however, the dark current is only $2.16 \times 10^{-7}$A for with a thin i-a-Si:H one. The photocurrent of sample with a thin i-a-Si:H is $2.51 \times 10^{-5}$A, and thus a photo-to-dark current ratio ($I_{\text{photo}}/I_{\text{dark}}$) of 10$^2$ is achieved for 850 nm infrared laser illuminated. Additionally, we try to deposit an oxide passivation layer between fingers on Si$_{0.8}$Ge$_{0.2}$ layer by liquid-phase-deposition (LPD) technique. Compared with the MSM-PDs without LPD oxide passivation layer, the dark current of MSM-PDs with LPD oxide layer is reduced from $1.73 \times 10^{-4}$A to $4.93 \times 10^{-5}$A at a bias voltage of 2 V, after annealing the dark current is reduced further to $1.67 \times 10^{-5}$A.


