Applications of vacuum transferred CVD graphene

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Abstract

Graphene has attracted an enormous attention for various applications including transparent conducting electrode and electronic device applications. Yet, the enthusiasm for the electronic device applications has been substantially diminished as the research on the bandgap generation was not so fruitful and many of drawbacks including self-heating and poor stability were disclosed [1].

Recently, the quality of CVD graphene and the device stability have been substantially improved using a vacuum transfer process [2]. Also, device integration processes optimized for graphene have been developed [3]. Furthermore, the limitation of zero bandgap could be avoided using graphene-semiconductor Schottky junction where very high on-off ratio could be achieved by modulating the Schottky barrier height [4].

Since many of the drawbacks of graphene holding the electronic device applications have been resolved, various applications including logic switch device and photodetector devices are being actively studied.

In this talk, unique benefits of graphene device and their applications will be discussed with a few device examples.

References

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[3] Y.J.Kim, Y.G.Lee, U.Jung, S.Lee, S.K.Lee, and B.H.Lee, Nanoscale 7, 4013-4019, (2015).

[4] H.J. Hwang, K.E. Chang, W.B.Yoo, C.H.Shim, S.K.Lee, J.H. Yang, S.Y. Kim, Y.S. Lee, C. Cho, B.H. Lee, Nanoscale 9, p.2442 (2017).

Figures

Figure 1: Vacuum transfer equipment

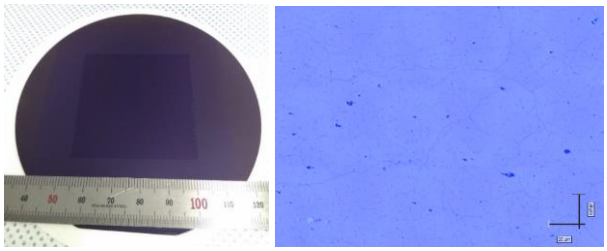

Figure 2: Large area device grade graphene transferred on SiO_2/silicon substrate

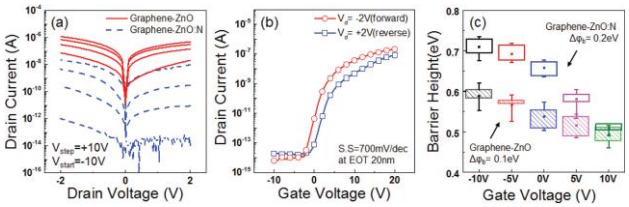

Figure 3: Electrical performance of graphene-ZnO barristor [4]

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