GrapheneforUS

Kyung-Eun Byun

Samsung Advanced Institute of Technology, South Korea

ke14.byun@samsung.com

2D Materials for Mass Production

Two-dimensional (2D) materials are ultrathin crystalline nanomaterials with a single layer of atoms with a high degree of anisotropy. 2D materials including graphene have drawn many attentions in semi-conducting industry because they have been considered as one of the candidate materials to overcome the limitation of Si technology beyond 5 nm node.[1] 2D materials research at SAIT has been progressing in two directions. For near term research, we explored 2D materials to enhance the performance of Si technology as interface materials, and for long term we looked into new potential applications. We have confirmed that 2D materials can be used as components of Si devices to improve these properties. [2][3] In pursuit of these research directions, we are investigating a wide range of technologies, from wafer scale 2D material growth to device fabrication. [4][5][6] In this presentation, we will review and discuss the issues and the progresses to apply 2D materials into CMOS devices.

References

[1] Y. Liu, X. Duan, H.-J. Shin, S. Park, H. Huang and X. Duan, Nature 591, 43 (2021)
[2] C.-S. Lee et al., Adv. Elec. Mater. 4, 1700624 (2018)
[3] K.-E. Byun, et al., Nano Letters, 13, 4001 (2013)
[4] M.-H. Lee, et al., Nano Letters, 18, 4878 (2018)
[5] M. Seol et al., Adv. Mater. 32, 2003542 (2020)
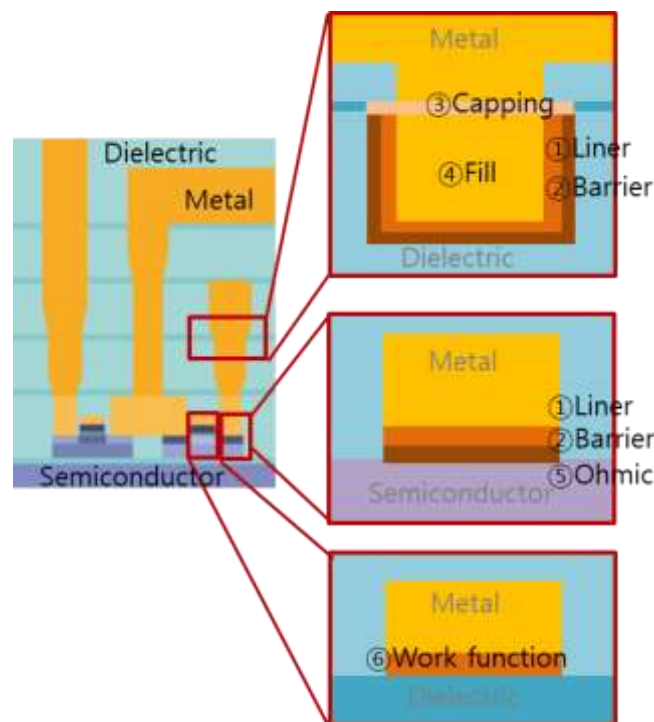[6] K.W. Shin 2D Mater. 7 011002 (2020)

Figures

Figure 1: Potential Applications of Graphene for CMOS devices