

Graphene-Embedded Nanopore Device

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Over the past decade, various researches for nano-channel and nanopore have been tried. ^[1] Especially, nanopore-based sensor has been studied for the detection of bio molecules or chemicals without any amplification or label. ^[2] Graphene is very suitable material to nanopore device, because its thickness is very effective to detect nanoscale material. ^[3] Here, we demonstrate Graphene-embedded nanopore device. Firstly, we prepared the transmission electron microscopy (TEM) grid with shallow area of silicon nitride in the center of the device. CVD-grown monolayer graphene is transferred onto silicon nitride substrate, and performed the atomic layer deposition process for Al₂O₃ dielectric layer. Then, TEM sculpting has been tried to create single artificial nanopore with sub 10 nm size. ^[4] Using this nanopore, we measured the ion transport through the hole by using patch clamp instrument.

References

- [1] C. Dekker, *Nature nanotechnology*, **2** (2007) 209-215.
- [2] Y.-R. Kim, J. Min, I.-H. Lee, S. Kim, A.-G. Kim, K. Kim, K. Namkoong, C. Ko, *Biosensors & bioelectronics*, **22** (2007) 2926-2931.
- [3] G. Schneider, S. Kowalczyk, V. Calado, G. Pandraud, H. Zandbergen, L. Vandersypen, C. Dekker, *Nano letters*, **10** (2010), 3163-3167.
- [4] , *Applied Physics Letters*, **93** (2008) 113107.