

9th International Workshop on 2D Materials

Title of the Presentation: *In-situ* STEM study on transformation of 2D nanostructures on a Graphene “Hot Plate”

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Short Biography:

Professor Sang Wook Lee has achieved his Ph. D at Seoul National University, Korea. He had worked at Gothenburg University in Sweden as a Post Doc. with a support of Nokia Research Center. He appointed as a professor at Konkuk University, Seoul, Korea in 2008-2016, then moved to Ewha Womans University. His main research field is nano electronics and nano mechanics. He is especially interested in following research subjects: Nano transport and nano electromechanical systems, Ultra-sensitive mass and force detector based on nano mechanical devices, In-situ electromechanical measurement of semiconductor nanowires. He received POSCO TJ Park science fellowship (2010) and Applied Physics research award (2016) by Korean Physical Society. He was selected as a Korea’s frontier scientist (2012) and Y-KAST member by Korea Academy of Science and Technology.

Abstract:

Dynamic surface modification of suspended graphene at high temperature was directly observed with in-situ scanning transmission electron microscope (STEM) measurement. The suspended graphene devices were prepared on top of the SiN membrane with hole substrate so that STEM observation was conducted under Joule heating processes. Current-voltage characteristics of suspended graphene devices inside of STEM chamber were measured to monitor and control the high temperature condition of graphene surface by estimating electrical power on the devices. During the in-situ STEM observation, it was found that residual materials remained on the graphene surface were removed at high temperature. Dynamic movement of residue on the graphene surface and shrinkage of atomic distance of graphene were also observed while the Joule heating process. The details of substrate and graphene device fabrication, STEM observation, and data analyses with simulation are described in this presentation.

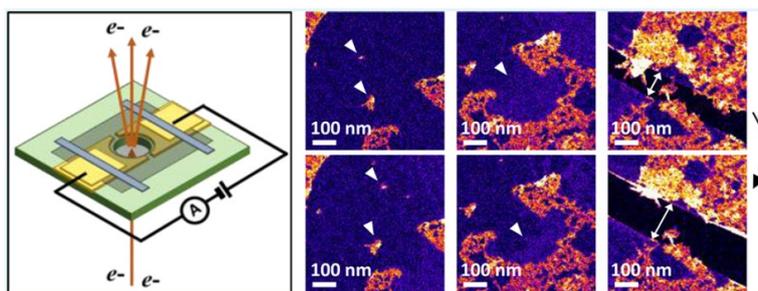


Fig.1 Schematics of graphene “hot plate” device for in-situ TEM investigation (left) and in-situ observation results on graphene surface during Joule heating process (right).

[1] Choi et al. ACS Applied Materials & Interfaces 12, 26313-26319 (2020).

[2] Inani et al. Advanced Functional Materials, 31, 2008395 (2021).