

7th International Workshop on 2D Materials

Title of the Presentation: Micro-LED and OLED display enabled by MoS₂ transistor array

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Short Biography:

Prof Jong-Hyun Ahn received Ph.D degree at POSTECH, Korea in 2001. He joined SKKU as an assistant professor in 2008 after the postdoctoral experience in the University of Illinois at Urbana-Champaign for several years and moved to Yonsei University in 2013. He holds Underwood distinguished professor at Yonsei University, Korea. He has worked as a president of Korean Graphene Society, a director of the Center for strain engineered electronic devices, and an associate editor of NPG Asia Materials.

Abstract:

The wearable display is applicable in human healthcare monitoring and robotics, and their operation relies on organic light emitting diodes (OLEDs). The development of semiconducting materials with high mechanical flexibility has remained a challenge and has restricted application to unusual format electronics. In this talk, we present a wearable full color OLED display using MoS₂-based backplane transistors fabricated on thin plastic substrates. In addition, we present the growth of MoS₂ on a gallium-nitride-epitaxial wafer and the monolithic integration of the TFT array and micro-LED pixels to produce an active-matrix micro-LED display. These strategies represent a promising route to attain heterogeneous integration, which is essential for high-performance optoelectronic systems that can incorporate the established semiconductor technology and emerging 2D materials.

[1]M. Choi et al., Sci. Adv. 4, eaas8721 (2018).

[2]M. Choi et al., Sci. Adv. 6, eabb5898 (2020).

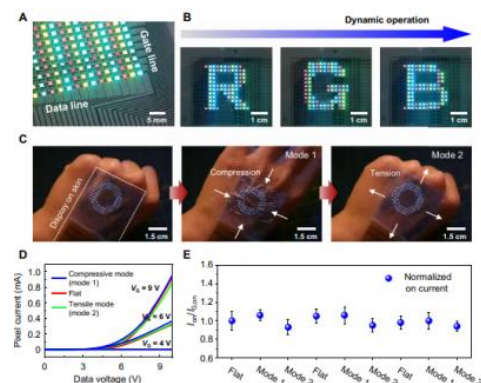


Fig. 1. Full color OLED display operated by MoS₂ backplane TFT.