Graphene and 2D materials for future electronics and displays

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Two-dimensional (2D) materials, including graphene, h-BN, transition metal dichalcogenides (TMDs), and so on, have huge potential to be exploited for the next-generation human-friendly soft electronic and optoelectronic systems due to their unique electrical, optical, and mechanical properties. During past 5 years, the Graphene Research Center at KAIST (KAIST-GRC), Korea, has demonstrated several electronic and optoelectronic devices based on low dimensional materials, i.e. field-effect transistors, gas sensors, nonvolatile memory devices, plasmonic waveguides, active metamaterials, and OLED displays, in which versatile properties of 2D materials have been incorporated into the electronic and optoelectronic platforms. However, there are several fundamental or technological issues to be addressed in the commercialization processes of 2D materials. In this talk, I will present the unique electrical characteristics of 2D materials and the recent advances in their synthesis and applications to electronics and displays fields at the KAIST-GRC.