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Engineering Graphene Electrodes for Flexible Display Applications

The recent advance in flexible, stretchable or wearable electronics derives the development of novel materials, which have high electrical or optical properties in addition to mechanical flexibility. In this perspective, two-dimensional (2D) materials, represented by graphene and related materials, have enormous potential to be exploited for the next-generation human-friendly electronic and optoelectronic systems due to their unique electrical, optical, and mechanical properties. During the last decade, we have demonstrated that versatile properties of graphene have been incorporated into the present-day electronic and optoelectronic technology, i.e., field-effect transistors, nonvolatile memory devices, chemical and biological sensors, plasmonic devices, and flexible display devices. However, there are still fundamental or technological issues to be addressed for the real applications of graphene to commercial electronics systems. In this talk, the recent advances in the display application of graphene from my research group will be presented. Specifically, I will discuss several engineering approaches, including reliable transfer methods for large-area graphene [1,2], surface or optical engineering for high-performance optical applications [3,4], and selective defect-healing techniques for improving the sheet resistance and mechanical property of graphene as an electrode material for flexible OLED devices [5].

References

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