

# The Adventure with Graphene: From Science to Industry

---

**Zhongfan Liu**

*Beijing Graphene Institute (BGI), Beijing 100871, China*  
*Center for Nanochemistry (CNC), Peking University, Beijing 100871, China*

[zfliu@pku.edu.cn](mailto:zfliu@pku.edu.cn)

---

with these super graphene glasses and graphene-covered optical fibers. The talk will give a brief overview of our last ten years studies on graphene synthesis and unique applications.

Graphene fever has passed over 14 years since its first isolation in 2004 and a great number of applications have been demonstrated in laboratories and even at industrial scale. However, a huge gap still exists between the ideality and the reality. The ideal graphene material is composed of single crystalline hexagonal honeycomb lattice of  $sp^2$  hybridized carbon atoms while the experimentally available graphene is a polycrystalline film with lots of structural defects and unexpected noncarbon impurities. As a result, the observed properties of graphene are far from theoretical predictions.

Over last ten years, we have made great efforts to build the footstone of future graphene industry from the material synthesis point of view and to explore the killer applications of graphene material. Our contributions to high-quality graphene synthesis covered from laboratory level CVD growth to mass production, including the large single crystal growth up to 4 inch, the fast growth, the doping growth with high carrier mobility, the super clean growth, etc. We have also succeeded in growing high quality graphene films on traditional glasses. The graphene endowed glass with extremely high thermal and electrical conductivities, leading to a new type of super graphene glasses. In a similar way, the graphene film has been deposited onto optical fibers under a high-temperature growth process, creating a graphene-decorated optical fiber. Various promising applications are demonstrated