

Graphene Field Effect Transistor on Liquid Substrate

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Abstract

Traditional graphene field effect transistors (GFETs) are fabricated on solid substrates, with which uneven strain and stress are often introduced in Graphene. The defects destroy the inherent quality of graphene and also reduce the charge carrier mobility of Graphene. Here, we used the polycaprolactone (PCL) material with a melting point of 60 degrees Celsius as the substrate of the GFET to explore the potential in improving the sensing performance of the GFET. By comparing the GFETs supported by solid PCL and GFETs supported by liquid PCL, we found that the liquid substrate better retains the intrinsic properties of graphene and restores a part of the charge carrier mobility. At the same time, GFETs with liquid substrates exhibited better-sensing performance. This is due to the stress release of the liquid substrate to the graphene of the solid substrate.^[1] In the future, stress-relieving graphene will bring more sensitivity and higher performance in graphene field effect transistors.

References

- [1] Belyaeva, L.A., Jiang, L., Soleimani, A. et al. Liquids relax and unify strain in graphene. *Nat Commun* 11, 898 (2020).