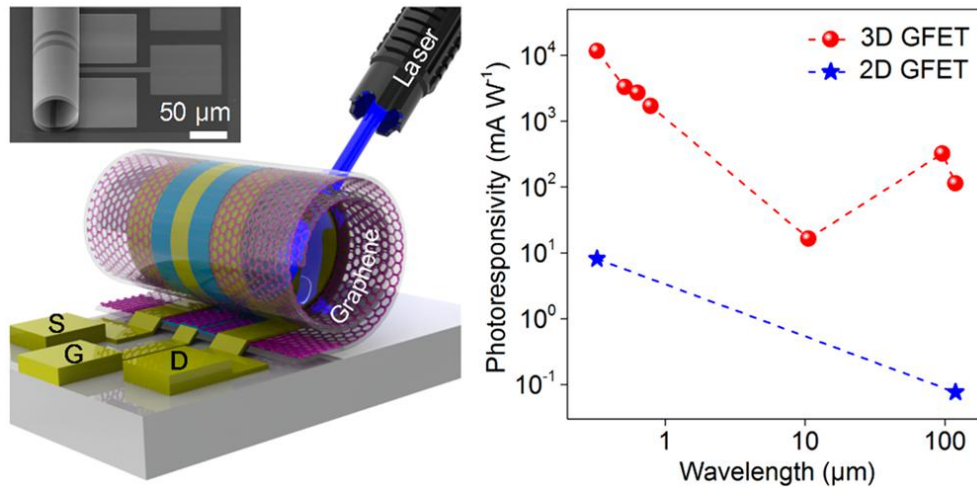


Three Dimensional Graphene Field-Effect Transistor as High-Performance Photodetectors

Speaker:李詠右 date:2019/05/06(Mon) 12:30-13:00



Abstract:

Because of excellent electric and optical properties, graphene is a good material for high performance photodetectors. However, the photoresponsivity of 2D graphene field-effect transistor (GFET) is too small, so scientists try to combine the graphene with other photosensitive materials to improve photoresponsivity. But the combination with other materials causes the slow photoresponse speed.

To solve the problem, authors and their group use a self-rolled up method to turn 2D GFETs into 3D GFETs. After rolling up, the resonant cavity is enhanced and the light-graphene interaction area is increased, the photoresponsivity is improved. The 3D GFET photodetector shows photodetection at room temperature using ultraviolet, visible, mid-infrared and terahertz regions. Both ultraviolet and visible photoresponsivity are more than 1A/W, and photoresponsivity of 0.232A/W at 3.11THz. The electrical bandwidth of these devices exceeds 1MHz. The broad spectral range, high responsivity and high response speed make it a promising material.

Key word: graphene、3D、photodetectors、FET、photoresponsivity.

Main references:

1. Three-Dimensional Graphene Field-Effect Transistors as High-Performance Photodetectors

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