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Transfer of Ultrathin Polymerized Molecular Films

A novel method uses a robust polymer and a graphene-based assembly for the cost-effective and damage-free removal and stacking of versatile, miniature, and thin polymer films for applications in optoelectronics, circuitry, and military/defense.

Researchers at Purdue University have developed new polymer thin films with an advanced stacking framework that can be used in optoelectronics, circuitry, and military/defense applications. Typically, polymer thin films are prepared on substrates for ease of fabrication but removing thin films from these surfaces can be time consuming, costly, and even lead to product damage. The method created by Purdue researchers' casts polydimethylsiloxane (PDMS) on a 2D graphene-based assembly where the polymerization process is conducted with polymer diynes and the resulting noncovalent nature of the substrate allows for easy removal of monolayer thin films. PDMS is uniquely robust enough to readily separate from graphene in this setup. In addition, this technique allows researchers to fine-tune ideal molecular features. The surface structures of these polymer thin films have been verified using atomic force microscopy (AFM). By stacking these thin films, multilayered device architectures are achievable.

Advantages:

-Miniature

-Thin

-Versatile

Potential Applications:

-Optoelectronics

-Circuitry

-Military/Defense

TRL: 2

Technology ID

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Category

Chemicals & Advanced Materials/Polymer Science & Smart Materials

Semiconductors/Devices & Components

Materials Science & Nanotechnology/Nanomaterials & Nanostructures

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