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Low Temperature Growth of Graphene on Arbitrary Substrates

A rapid, low-temperature, non-catalytic synthesis method for graphene enables cost-effective industrial mass production of graphene devices on various materials without the need for material transfer.

Graphene has attracted a great deal of interest in the scientific and technological community owing to its impressive properties and potential for application in electronics, photonics, sensing and many others. Chemical vapor deposition (CVD) has been the most widely used method of obtaining graphene, thanks to its reliability, scalability, and relatively quick turnaround time. The conventional CVD technique requires very high temperatures, sometimes exceeding 1000 degrees Celsius, greatly limiting the type of substrates used. Therefore, there is a need for methods of producing graphene on various substrates and at lower temperatures.

Researchers at Purdue University have discovered a simple process for producing graphene at lower temperatures, around 650 degrees Celsius, using remote plasma-enhanced chemical vapor deposition (PECVD) on various substrates. This new method is a one-step process, completely catalyst free, and does not require any pre-processing. Furthermore, this process enables full coverage of graphene over large areas within a few minutes, making this approach greener than conventional techniques. This low-temperature, rapid, non-catalytic synthesis of graphene is believed to provide a means for industrial mass production of graphene devices.

Advantages:

-Rapid graphene growth on arbitrary non-catalytic materials

-Eliminates the need to transfer graphene

-Provides feasible means for industrial mass production of graphene devices

Potential Applications:

-Manufacturing graphene devices

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Category

Semiconductors/Fabrication & Process Technologies
Materials Science & Nanotechnology/Nanomaterials & Nanostructures

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