High-quality Chemical Vapour Deposition (CVD) produced graphene.

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Since its first isolation from graphite, graphene has exhibited interesting properties such as high electrical conductivity and flexibility. These properties catapulted graphene to be at the forefront of most applications from energy storage to biological sensors. The effectiveness of graphene in different applications is affected by the synthesis technique used, which affects the quality, the number of layers and the orientation of the graphene sheets. Many synthesis techniques have been developed; however, the chemical vapour deposition (CVD) technique has attracted much attention because it generates high-quality graphene. In this study, the use of CVD for the synthesis of high-quality graphene with a controllable number of layers is explored. Different parameters were investigated such as carbon source type, carbon source flow rate and the reaction time. The synthesised graphene was characterised using Raman spectroscopy, Scanning electron microscopy (SEM) and X-Ray photoelectron spectroscopy (XPS). Graphene materials with different quality and number of layers were produced. Preliminary Results have shown that graphene materials with bilayers to multiple layers were successfully produced. The Raman analysis also indicated the formation of high-quality graphene. The produced graphene materials will be tested for the development of biosensors, where it will be used as a substrate in Surface-enhanced Raman spectroscopy (SERS) for the detection of different analytes.

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