

## Synthesis of Graphene by Microwave surface wave plasma chemical vapor deposition

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Graphene is a two dimensional carbon material that has been attracting great interest because of its unique electric properties and high potential for different application. So far, single-layer graphene has been grown by different methods, including mechanical exfoliation, epitaxial growth on silicon carbide at high temperature, chemical vapor deposition (CVD) on catalytic metal substrates and microwave surface plasma chemical vapor deposition (MW-SWP-CVD). Among them, the chemical vapor deposition method has been widely used to obtain large-scale graphene. This method requires high temperatures for decomposition of hydrocarbons source. However a low temperature process for the graphene synthesis would be required for the application of graphene in electronic devices. MW-SWP-CVD is the alternative process for the synthesis of graphene at low temperature. In order to grow high quality graphene all basic process such as substrate preparation and others process are very important. The substrate preparation was performed by polishing and thermal annealing process at high temperature at hydrogen environment. Graphene was grown by MW-SWP-CVD process. The grown graphene were characterized by Raman spectroscopy, scanning electronic microscopy, transmission electron microscopy, atomic force microscopy, and X-ray deflection.

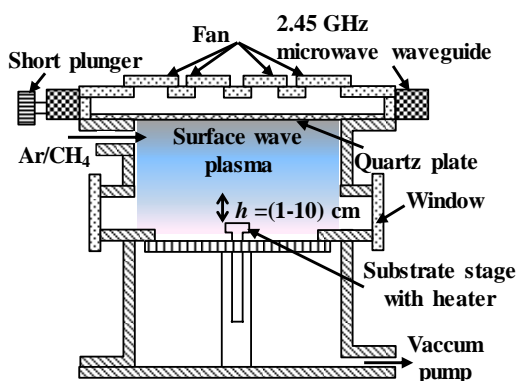


Fig.1 MW-SWP-CVD diagram

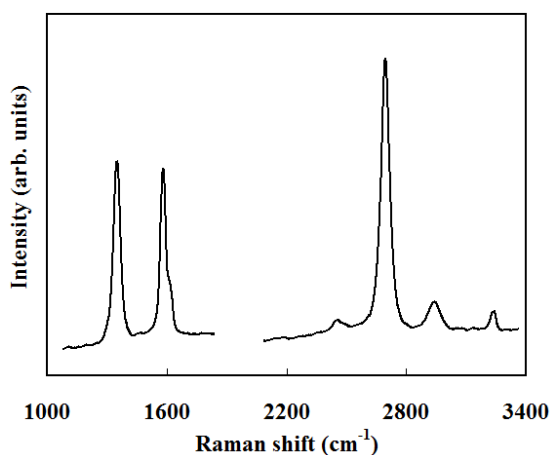


Fig. 2 The Raman spectra of graphene