Growth and electrochemical properties of carbon nanosheets via microwave plasma enhanced chemical vapor deposition

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Since the successful fabrication by Geim and his coworkers in 2004 [1], single-layer sheet of graphene is "rising-star" materials and has attracted a great attention because of its promising properties and potential applications. Certainly, multilayered graphene nanostructures are equally interesting and worthy of investigation in the fields of electronic devices, supercapacitprs, solar cells, sensors and so on. Carbon nanosheets (CNSs, also named as carbon nanowalls, nanoflakes, petal-like films and so on), one of the multilayered graphene nanostructures, have been reported by many groups employing various synthetic methods such as arc discharge-based techniques, radio frequency sputtering, plasma enhanced chemical vapor deposition (PECVD) and other chemical processes. Among those methods, PECVD is regarded as promising means for CNS growth due to its feasibility and potentiality for large-area production with high quality, high growth rate and/or atomically thin. Here, we report a facile growth of CNSs by microwave PECVD (MPECVD) without any catalySt at relatively low temperatures (less than 500 ^{o}C). Significantly, as-grown CNSs mainly consiSt of from 2 to 7 layers of graphene in large quantity. Detailed results including electrochemical properties will be presented in the conference.

[1] K.S. Novoselov, A.K. Geim, S.V. Morozov, D. Jiang, Y. Zhang, S.V. Dubonos, I.V. Grigorieva, A.A. Firsov, *Science* **306**, 666 (2004).