

SYNTHESIS OF CARBON NANOWALLS (CNWs) ON A SiO₂ SUBSTRATE BY MICROWAVE PLASMA-ENHANCED CHEMICAL VAPOR DEPOSITION (MPECVD) WITHOUT CATALYST

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ABSTRACT

Carbon nanowalls(CNWs) sheets have been synthesized by microwave plasma enhanced chemical vapor deposition(MPECVD) using mixture of C₂H₂ and H₂ gases on SiO₂ substrates. It is revealed that the CNWs are grown at the fine-textured structure on the SiO₂ and the growth process does not require the catalyst. The effect of microwave power on surface morphology has been investigated. Continuous increase in height and decrease in width of carbon walls with increasing reaction time have been observed by scanning electron microscopy (SEM). Raman spectroscopy of these films revealed characteristics of disordered microcrystalline graphite. Possible growth mechanism of carbon nanowalls has been discussed with time evolution of surface microstructure.

Keywords: CNWs, MPECVD, catalyst, growth mechanism.