Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

Fabrication of vertically standing carbon nanowalls by electron beam excited plasma-enhanced CVD MINEO HIRAMATSU, TAKAKERU MORI, Meijo University, MASARU HORI, Nagoya University — Carbon nanowalls (CNWs), two-dimensional carbon nanostructures, have been grown recently. CNWs are the graphite nanostructure with edges, which comprise the stacks of plane graphene sheets standing almost vertically on the substrate. The large surface area and thin edges of vertically standing CNWs are useful as templates for the fabrication of other types of nanostructured materials as well as an electron field emitter, which have potential applications in energy storage, as electrodes for fuel cells, sensors, and field emission display. In this work, an electron beam excited plasma (EBEP)-enhanced CVD was applied to the synthesis of CNWs. The EBEP is a high-density and low-temperature plasma directly produced by a high-current and low-energy electron beam. Growth experiments were carried out at an electron-beam current of 2A and an electron-acceleration voltage of 60-100 V, a total pressure of 2-4 Pa, and the heater temperature of 550-650°C. Well-defined, vertically standing CNWs were successfully fabricated at growth rate of 32 nm/min by EBEP-CVD employing CH_4/H_2 mixtures. CNWs grown here were very thin, and their thickness was less than 3 nm. The density of CNWs (average distance between adjacent nanowalls) was controllable in the range of 50 to 200 nm by changing the total gas pressure.

Mineo Hiramatsu
Meijo University

Date submitted: 15 Jun 2007 Electronic form version 1.4