

SYNTHESIS OF SINGLE-WALLED
CARBON NANOTUBES IN DUSTY
GLOW-DISCHARGE PLASMA

Ya. Hayashi, Ya. Masaki, R. Yamada

Kyoto Institute of Technology
(*Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan*)

S u m m a r y

Carbon fine particles including single-walled carbon nanotubes (SWNTs) are synthesized by the hot-filament and plasma-assisted chemical vapor depositions, and their specific surface area is evaluated. Discharge was unstable with electrons depleted in plasma during the growth of fine particles because of the attachment of most electrons on them. The electron density and the dust charge decrease simultaneously in plasma with high dust density. The absolute dust potential is calculated, and the result indicates that a higher dust potential $|V_D - \phi_{TB}|$ is realized in a higher density plasma, especially, under certain conditions of high density and large size for dusts. Carbon fine particles of larger surface areas are expected to be synthesized in higher density plasma owing to the defect induction in SWNTs by the energetic ion bombardment.