Plasma grown surface bound single wall nanotubes EUGENE TAM,
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TEAM — Many researchers believe that Vertically Aligned Single Wall Carbon
Nanotubes (VASWCNTs) are the answer to many foreseen issues with today’s semi-
conducting industry involving miniaturization. However dense arrays of surface
bound VASWCNTs can only ascertain a maximum length after which growth seems
to halt, something of which is commonly attributed with catalyst poisoning. Nucle-
ation of VASWCNTs also seems to require extremely high temperatures, unsuitable
for direct growth of VASWCNTs onto nanoelectronic devices, however there has
been some recent experimental evidence that sub 500 °C growth of VASWCNTs is
possible. In this poster, Monte-Carlo simulations have been used to elucidate the
effects of plasmas on the substrate and lateral surfaces of the nanotubes, increasing
mobility, adsorption and desorption. In addition to surface interactions, plasmas
also allow for the control of precursor trajectories allowing adatoms to land closer to
the base of the VASWCNT. We show that the precursor distribution along the lat-
eral surface of the nanotubes is the primary cause for the VASWCNTs to slow down
and, using appropriate plasma conditions, longer VASWCNTs and growth rates up
to an order of magnitude higher than their neutral counter parts can be achieved in
plasma environments.

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