MICROWAVE SYNTHESIS OF ALIGNED CARBON NANOTUBES IN A SINGLE MODE CAVITY

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Using a 2.45 GHz wave-guided cavity, in a single mode TE_{103} excitation, we were able to physically locate a small sample separately at the H (magnetic) node (where the E field is nearly zero), and the E (electric) node (where H field is nearly zero). Various materials, such as ceramics, powdered metals and composites, exhibited remarkable differences in their microwave heating behaviors [1,2]. Well-aligned multiwall carbon nanotubes (CNTs) have been synthesized on Fe-coated Si wafers in this single mode microwave cavity using acetylene as the carbon source at temperature ranges of 700-800°C in 5-10 minutes. The average length of microwave synthesized CNTs was around10-15 microns. The diameter of microwave synthesized CNTs could be controlled form 30 nm to 150 nm by adjusting the acetylene/hydrogen ratio. Higher acetylene concentration produced larger diameter CNTs. The differences of microwave synthesis of CNTs in E and H fields were investigated as well.

REFERENCES

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