

Synthesis of aligned carbon nanotube (acnt) through catalytic decomposition of methane by water-assisted chemical vapor deposition (wacvd)

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Abstrak

The production of Carbon Nanotubes (CNT) has a problem with the limited results of Aligned CNT (ACNT) products, due the fact that an effective and economical method has not yet been discovered. This research used catalytic decomposition of methane with the Water-Assisted Chemical Vapor Deposition (WA-CVD) method by using a bench-scale plate structured catalyst reactor and a fixed bed reactor. The Fe-Ni/Al₂O₃ Catalyst prepared by sol-gel/dip-coating and Ni-Cu-Al Catalyst prepared by co-precipitation were used to make the CNT. Transmission Electron Microscope (TEM) results show there are various types of nanocarbons produced, such as CNT, bamboo-shaped CNT and also quasi-spherical carbon onion shapes. Based on comparative results without adding the water vapor method, ACNT, which were obtained with WA-CVD, tend to grow vertically, even though they have not yet formed neat and uniform shapes. In addition, an increased number of CNT have high purity results. It shows that the role of water vapor significantly improves the quality of CNT.