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Novel processing of synthesis carbon nanotube on biomorphic materials for filter applications

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A novel approach towards the formation of Carbon Nanotubes (CNTs) onto biomorphic carbon membrane was attempted by the application of three different reaction techniques. Carbon membranes having pore dimensions of 20-25 μm were developed using carbonizing reaction. Template crystals (LTA, silicalite, mesoporous SiO_2 etc.) were simultaneously synthesized and coated within the Biomorphic Carbon Materials (BCM) by an in situ hydrothermal process and were subjected to a simple ion loading reaction for preparing the suitable catalyst material for carbon nanotube-filters. The carbon nanotubes were grown directly upon biomorphic substrates. The CNTs were seen to have grown as bush-like structures creating a close network inside the pores of the ceramic substrate. The HRTEM images that were obtained at 700 $^{\circ}\text{C}$ show a considerably thicker wall thickness and the widest hollow-inner-tube structure, whereas those of the CNTs that were obtained at 650 $^{\circ}\text{C}$ show a comparatively thinner outer wall and narrow inner-tube structure with smooth walls. The maximum carbon yield is 23, 71% for the reaction time of 180 minutes. This CNTs nano-filter can be used for filtration of gases and has significant filtration efficiency without pressure drop which is because the carbon nanotubes function as the trap of gas molecules.

Biography

Ik Jin Kim has completed his Dr.-Ing in 1992 at GHI, Technical University of Aachen, RWTH in Germany. In March 1994, he worked as a Professor at the Department of Materials Science and Engineering at Hanseo University and concurrently Director of the Institute for Processing and Application of Inorganic Materials (PAIM). He was the Director of the Institute of Advanced Ceramics for Semiconductor (IACS) at BIEMT Ltd., and also the author and co-author of over 250 journal publications and presented numerous international conference papers. From 2007-2008 he was a Guest Professor at ETH in Zurich, Switzerland.

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