

A Large-Scale Synthesis Process of Carbon Nanofibers through Simplified Thermal Growth

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Abstract

A large-scaled carbon nanofibers was synthesized on Ni-coated stainless foil using a simplified thermal growth. The surface amount of Ni thin film apparently increased with concentration of nickel nitrate by spin-coating method. A liquid-type thin film, phenolic resin, was used as carbon precursor and coated on Ni thin film. The growth of carbon nanofibers was performed in a home-made reactor at 1 atm. It was found that the produced carbon nanofibers were strongly influenced by surface density of Ni thin film. With increasing Ni density, the density and length of carbon nanofibers increased. High-resolution transmission electron microscope image clearly indicated the nanofibers to be graphitic planes of short ranges, and imperfect graphite structures were confirmed from selective area diffraction and X-ray diffractometry. Additionally, a growth mechanism for the carbon nanofibers was explored in the present work.

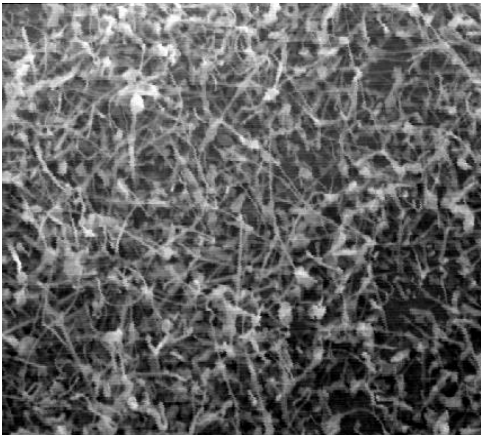


FIG. 1. SEM images of carbon nanofibers grown from Ni-based catalytic film prepared by spin-coating method.

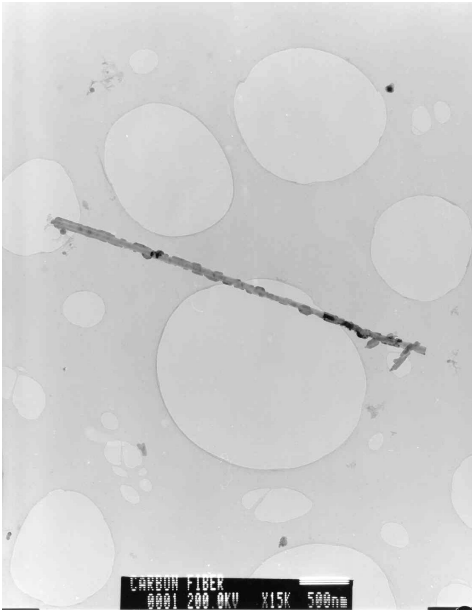


FIG. 2. The bright-field TEM image of single carbon nanofiber.

