Preparation of carbon nanocoils by the catalytic pyrolysis of acetylene and the properties

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(ABSTRACT) Carbon nanocoils with a 3D-helical/spiral structure and a coil diameter of several hundred to several nanometers were prepared by the Ni-catalyzed pyrolysis of acetylene. The preparation conditions, morphology, growth mechanism, microstructure and some properties were examined. Using fine powder of metals, ceramic powder-supported metals or sputtered metal thin films as the catalyst, carbon nanocoils as well as carbon microcoils were obtained. The carbon nanocoils were generally a single coil with the twisted form. The carbon coils could effectively absorb the magnetic waves of GHz region.

Carbon microcoils

Carbon microcoils (1)

Carbon microcoils (2)

TEM images of heat-treated carbon nanocoils

Raman spectra of the carbon coils obtained with the application of high magnetic field

Reflection loss (1)
(a) carbon coils, (b~d) carbon powders, (e) straight carbon fibers

Reflection loss (2)