

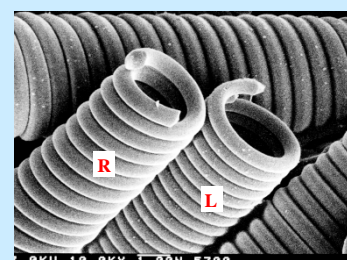
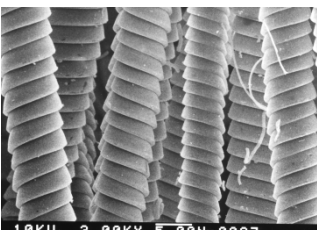
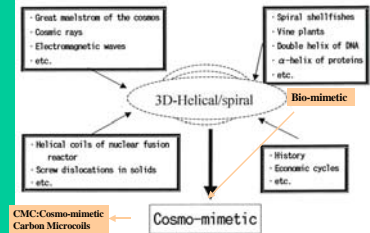
Cosmo-Helical/Spiral Materials and Their Potential Applications

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As can be seen in the great maelstrom of the cosmos, the double helix of DNA, α -helix of proteins, screw dislocation in solids, three dimensional (3D) helical/spiral structure is the fundamental structure in all objects. The helical/spiral-structured materials are potential candidates for electromagnetic wave absorbers in the GHz regions, hydrogen absorbers, field emitters, tunable microdevices, microsensors, microactuators, chiral catalysts, capacitors, energy converters, etc.

A New concept for the development of novel functional materials



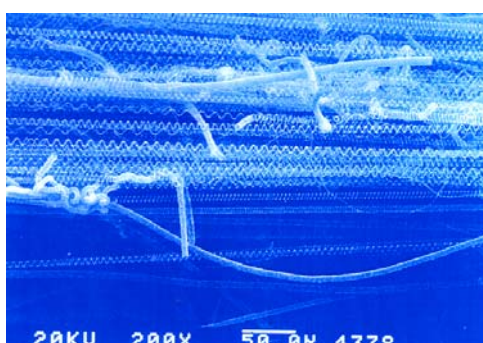
Representative regular carbon microcoils with a constant coil diameter and coil pitch.

Ruptured cross sections

Irregularly coiled carbon microcoils with large coil diameter



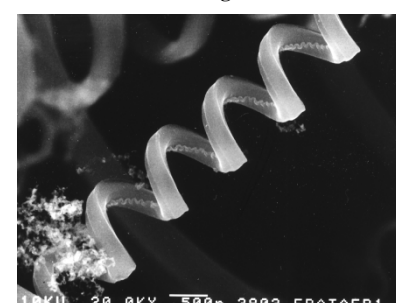
Carbon microcoils with different coil length



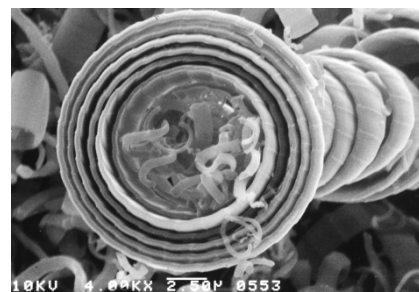
Elastic carbon microcoils



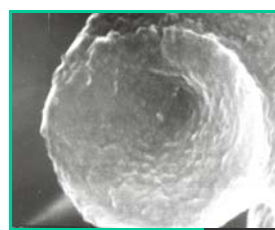
Tip Part of the carbon coil. Arrow: catalyst grain



Single coil with flares in the inner side of coils.

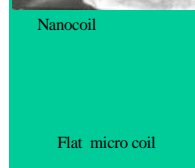


Conically coiled ribbon-like-fibers

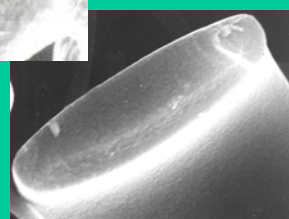


Ruptured Cross Sections

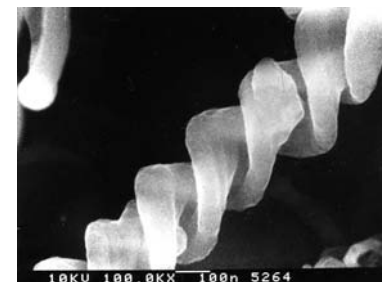
Difference from Carbon Nanotubes:
 (1) 3D-helical/spiral structure
 (2) without nanopore (tube)
 (3) amorphous



Nanocoil



Flat micro coil



Carbon nanocoils

日本工電新用
 コラーゲン生成効果
 が顕著な表皮細胞増殖も促進
 効果あり

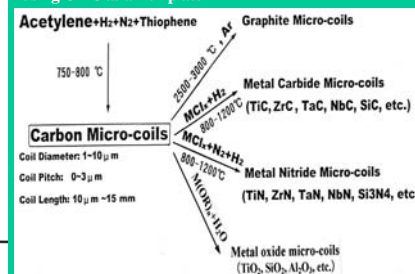
Discovery!! MENARDO Cosmetics :

Promotion effects of CMC on metabolism, especially Collagen formation in skin cell---more young and more beautiful !!

Potential Application of CMC

1	Electromagnetic Absorbers	(1) Beads (2) Forms (3) Ceramic Beads (4) Super-thin EM Absorbers for Aerospace
2	Tactile Intelligent Sensors	(1) Humanoid Robot Sensors (2) Medical Robot Sensors (3) Aerospace Sensors
3	Micro-Antenna	(1) Micro-Antenna for Aerospace (2) Array Antenna with High Gain·High Functionalities
4	Cosmetics	(1) Activation of Metabolism, (2) Promotion of the Formation of Collagen in Skin Cell
5	Etc.	(1) Composites with Super-Elasticity (2) Tunable Heating Materials (3) Fibers and Papers Containing CMC

Preparation of Ceramic Microcoils/microtubes using CMC as a Template



Multiple-helix CMC

