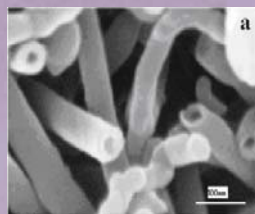


納米材料及納米應用產品
Nanomaterials and nano enabled products

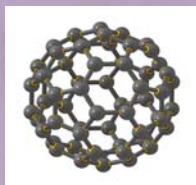
Nano Carbon Materials 納米碳材料

In the world of nanotechnology, nano- carbon materials is a highly active research area which attracts researchers from worldwide. Examples of nano-carbon materials include carbon nanotubes, fullerenes and diamondoids, etc.

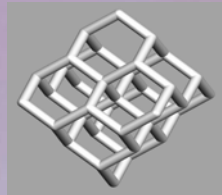
於納米技術世界當中，納米碳粉材料為首要的技術發展趨勢，吸引著全球無數學者研究。納米碳粉材料的例子包括：納米碳管，富勒稀及類鑽石等。



CNT 納米碳管



Fullerene 富勒稀 C60



Diamondoid 類鑽石

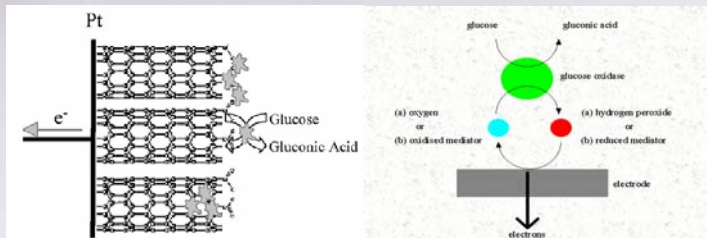
Carbon Nanotubes (CNTs) Applications

納米碳管應用

Biosensors 生化感應器

Aligned multi-wall carbon nanotubes (MWNT) grown on platinum substrate are used for the development of a biosensor. The opening and functionalization by oxidation of the nanotube array allows for the efficient immobilization of the model enzyme, glucose oxidase.

把納米碳管生長在白金基質上用作發展生化感應器。



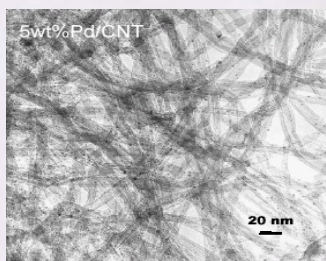
Source: ANAL BIOANAL CHEM 2003, 375, 103-105

Nanotubes serve as an immobilization matrix and mediator

Catalyst Support 催化劑支持

Platinum nanoparticles supported on the carbon nanotubes used as the cathode for a direct methanol fuel cell.

把白金納米粒子的催化劑承托在納米碳管直接用於甲醇燃料電池上。



Transmission electron microscopic images of Pd/CNT Catalysts

Reference: CARBON 2002, 40, 787-



Platinum nanoparticles supported on carbon

Reference: CARBON 2002, 40, 787-803

Fullerenes Applications 富勒稀

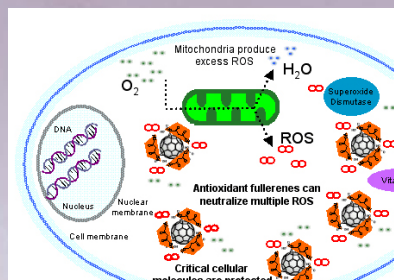
Fullerenes are one of only four types of naturally occurring forms of carbon. They are molecules composed entirely of carbon, taking the form of a hollow sphere, ellipsoid, or tube.

富勒稀是元素碳的四種同素異形物其中之一。富勒稀的份子是全由碳份子構成，它們的形狀包括球狀，橢球狀或管狀。

Anti-oxidant 抗氧化劑

C Sixty's fullerene technology proposed that fullerene antioxidants bind and inactivate multiple circulating intracellular free radicals.

C Sixty's fullerene technology



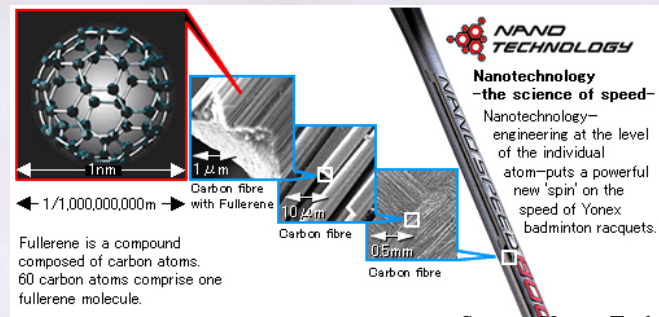
估計富勒稀可作為抗氧化劑，它會與細胞中的自由基結合和使鈍化。

Source: C Sixty Inc.

Strength Enhancement in Rackets 物料強化

The Yonex nano-structure uses nano-size particles of fullerene and carbon to enhance the mechanical strength of the badminton rackets. Yonex nano-structure

加入富勒稀納米粒子於羽毛球拍中增強球拍本身硬度和強度。

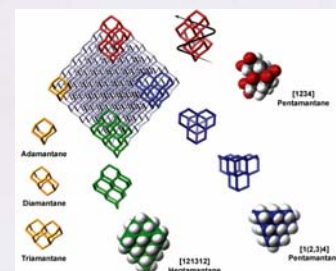


Source: Yonex Technology

Diamondoids 類鑽石

Structures that resemble diamond in a broad sense, strong stiff structures containing dense, three dimensional networks of covalent bonds; diamondoid materials could be as much as 100 to 250 times as strong as titanium, and far lighter.

Source: Chevron



類鑽石是一種結構緊密，由三維空間的共架鍵組成的氫碳化合物，強度可以比鈦金屬強 1000 至 250 倍，但遠比鈦輕。

Potential Application Areas 潛在應用範圍

1. Pharmaceuticals 藥物學
2. Micro-electronics 微電子學
3. Engineering Materials 材料工程學

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納米科技推動可持續發展的知識型經濟 NanoTech: for a knowledge-based sustainable economy