

富勒烯C60 及其衍生物的观察与测定

Evaluation of Transparent Electroconductive Paints Distribute MWNT

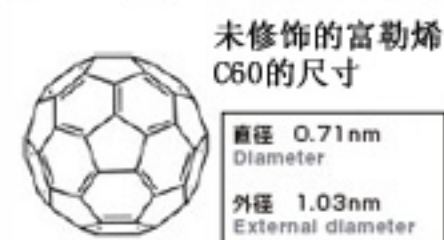
富勒烯C60具有由60个碳原子构成的足球形结构。人们正在积极开展富勒烯衍生物在液晶替代材料、电容器·电极材料等工业材料领域的应用研究。本文介绍通过SPM观察富勒烯C60及其衍生物，测定粒径的实例。

利用超声波振动，将C60及其衍生物分散于甲苯中，调节浓度后，滴在云母板上干燥，直接进行SPM观察。在测定直径时，为避免探针直径的影响，没有采用水平方向的距离，而是采用垂直方向的高度进行测定。C60的直径大约为1nm，衍生化后的C60反映出各自的构造，测得的尺寸较大。

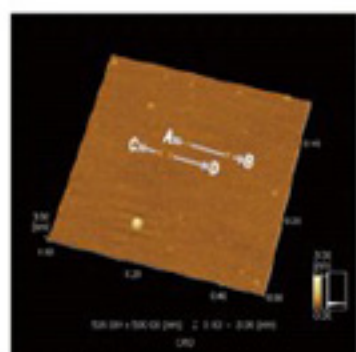
Fullerene C₆₀ has a structure with sixty carbon atoms puff of soccer ball shape. Application research is actively conducted for industrial materials, such as alternative liquid crystal, capacitors and electrodes by derivatizing C₆₀. Here, we introduce example of measurement of C₆₀ and its derivatives using SPM.

After we dispersed C₆₀ and its derivatives in toluene using ultrasonic vibration, we adjusted its concentration and dried after dropping it on mica base plate, and observed it using SPM. Diameter was measured using its vertical height, not horizontal height, considering the size of the probe. The diameter of C₆₀ was about 1nm and the diameters of its derivatives were larger than C₆₀ reflecting their structures.

1. C60 (未修饰) (unmodified)

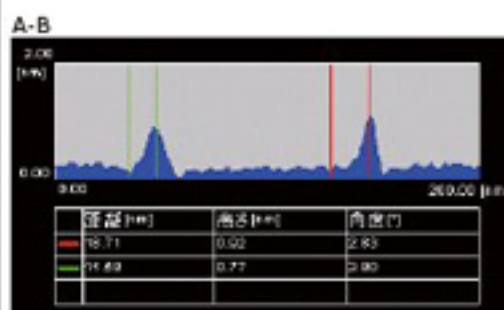


* (参考: [富勒烯的化学与物理]
获原久典、斋藤弥八 著
名古屋大学出版会1997年)



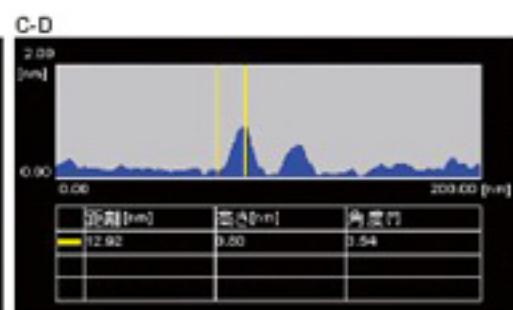
形貌像

Topographic image

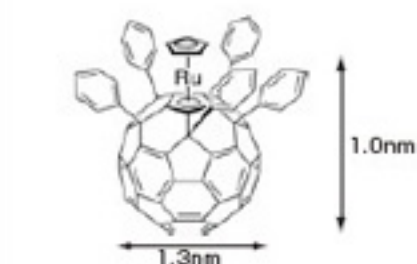


截面形状解析

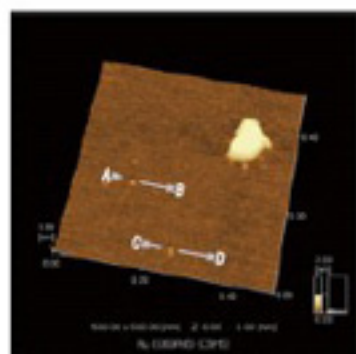
Profile analysis



2. C60衍生物 derivative Ru(C₆₀Ph₃)(C₆H₅)

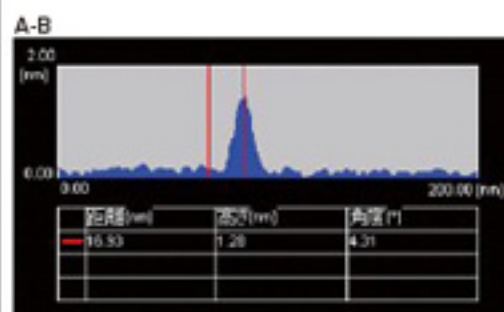


Y. Matsuo, Y. Kunitoku, S. Ito, and E. Nakamura
Chem. Lett. 2004, 33, 68.



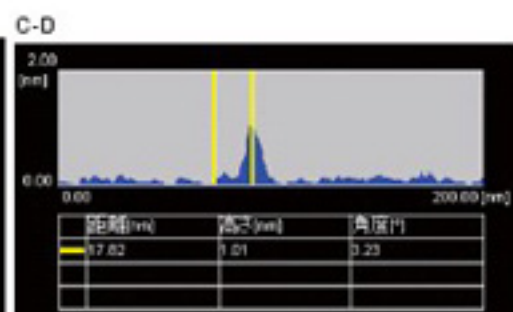
形貌像 500×500[nm]

Topographic image

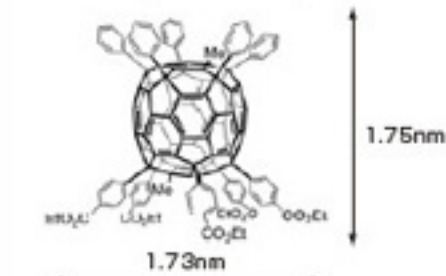


截面形状解析

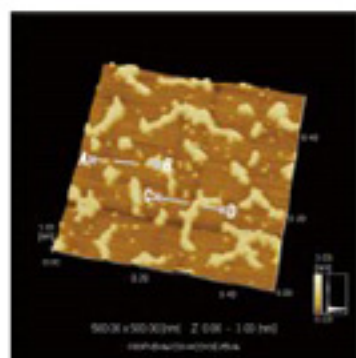
Profile analysis



3. C60衍生物 derivative C₆₀Ph₃Me(C₆H₄COOEt)₃Me

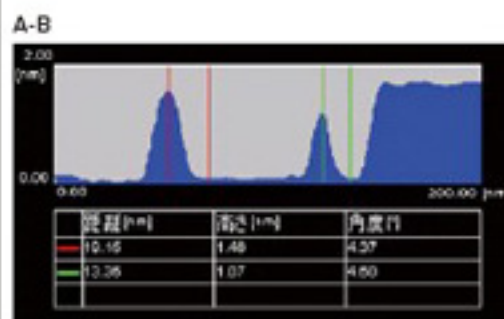


Y. Matsuo, K. Taira, M. Sawamura, and
E. Nakamura J. Am. Chem. Soc. 2004, 126, 8725.



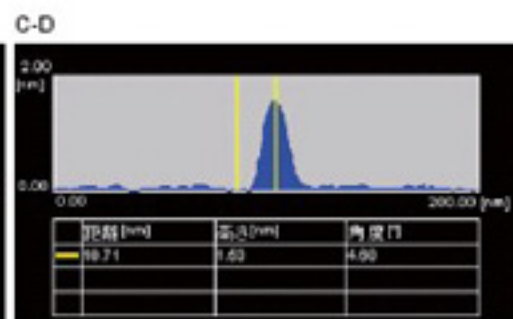
形貌像 500×500[nm]

Topographic image

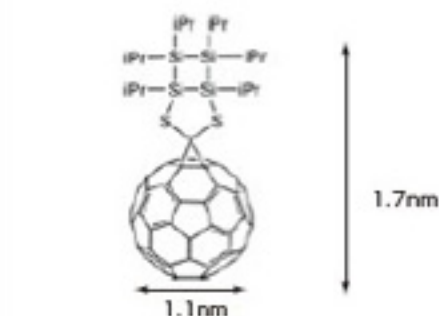


截面形状解析

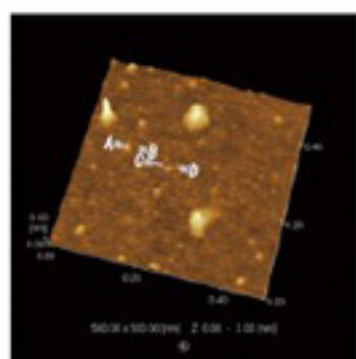
Profile analysis



4. C60衍生物 derivative C₆₀ [CS₂Si₄(iPr)₃]

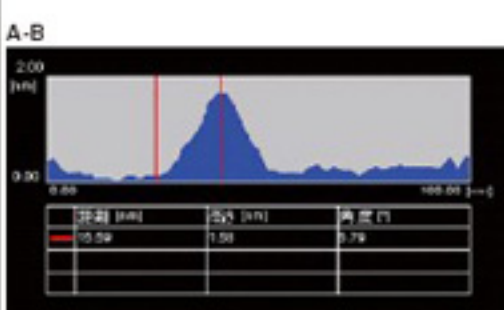


H. Nakawa, et al. Angew. Chem. Int. Ed.
Engl. 2005, 44, 7739.



形貌像 500×500[nm]

Topographic image



截面形状解析

Profile analysis

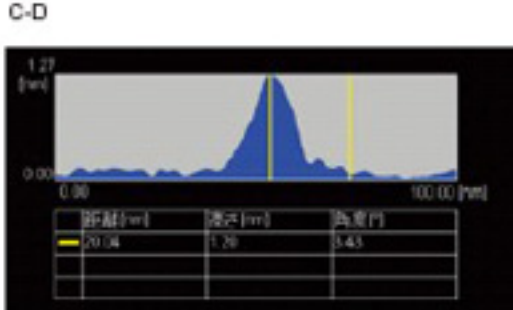


图2~4中的值由X射线晶体结构解析装置测得

样品1: MTR制 纯度99.95%

样品2、3由科学技术机构 ERATO中村活性炭Cluster计划 松尾丰先生提供

样品4由筑波大学 尖端学际领域研究中心 赤阪健先生提供