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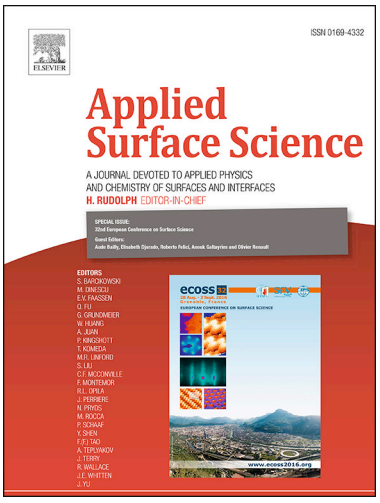

Full Length Article

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ACCEPTED MANUSCRIPT

Intrinsic hydrophilic character of carbon nanotube networks

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Abstract

We have demonstrated that nanocarbon materials such as carbon nanotubes (CNTs) or graphene have an intrinsically hydrophilic nature. Addition of liquid hydrocarbons or polycyclic aromatic compounds, which are the common side-products of nanocarbon syntheses, turned the otherwise hydrophilic CNT films hydrophobic. The very small amount needed to cause this effect was not discernable by SEM or Raman spectroscopy and also it could be easily overlooked by other methods of analysis. Upon simple and rapid thermal desorption of these species we were able to fully recover the water affinity in these CNT networks. Without using any oxidizing agents the material remains hydrophilic for weeks having water contact angle of about 35°. The results pave the way towards implementation of low-dimensional nanostructures in the real life without disrupting their inherent properties.

Introduction

Ever since carbon nanotubes (CNTs) and other forms of nanocarbon were discovered, they have attracted the attention of the R&D community at many fronts most commonly even non related to each other such as optics [1-3], mechanical engineering [4, 5], electronics [6, 7], thermal management [8, 9], *etc.* However, one of the major impediment factors that

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