1

Pristine and intercalated single wall carbon nanotubes and graphite revisited: A key to graphene

Thomas Pichler[1] Christian Kramberger[1] Alexander Grüneis[1] Angel Rubio[2] Martin Knupfer[3] Roman Schuster[3] Denis Vyalikh[4] Sergey Molodtsov[4] Erik Einarsson[5] Shigeo Maruyama[5] Claudio Attaccalite[2] Lucia Reining[6] Christine Giorghetti[6] Ralf Halmbach[6] Jörg Fink[7] Rolf Follath[7]
[1]Faculty of Physics, Vienna University, Vienna
[2]Donestia Science Center, San Sebastian, Spain
[3]IFW-Dresden, Dresden, Germany
[4]TU-Dresden, Institut für Festkörperphysik,Dresden, Germany
[5]Tokyo University, Tokyo, Japan
[6]Ecole Polytechnique, Palaiseau, France
[7]BESSY II, Berlin, Germany

In this contribution an overview about our recent results on the electronic and optical properties of pristine and intercalated aligned single wall carbon nanotubes and graphite using high energy spectroscopy techniques, namely angle resolved photoemission and electron-energy loss spectroscopy, as probes is presented. The consequences of doping on basic correlation effects and local field effects and their influence on the band structure and the plasmon dispersion are discussed in detail. Especially, we will show the impact of our results in order to unravel the underlying electronic and optical properties of graphene. Work supported by the DFG projects PI 440 3/4/5.

2

Preparation and selective properties of a new composite material for electrochemical capacitor built of single-wall carbon nanotubes coated with the fullerene-palladium co-polymer and bithiophene polymer film

Piotr Pieta[1] Ganesh M. Venukadasula[2] Francis D'Souza[2] Wlodzimierz Kutner[1]
[1]Institute of Physical Chemistry, Polish Academy of Sciences, Kasprzaka 44/52, 01-224 Warsaw, Poland
[2]Department of Chemistry, Wichita State University, Wichita, Kansas 67260, USA

A new composite material for charge storage in electrochemical capacitors was devised and tested. It was built of electrophoretically deposited HiPCO single-wall carbon nanotubes, non-covalently surface-modified by 1-pyrenebutiric acid (pyr-SWCNTs), and then coated by electropolymerization with a film of mixed fullerene-palladium (C60-Pd) and bithiophene polymers. Both the electrophoretic and electropolymeric deposition was in situ monitored by piezoelectric microgravimetry with an electrochemical quartz crystal microbalance. The AFM imaging of the material showed tangles of pyr-SWCNTs bundles surrounded by globular clusters of the (C60-Pd)-bithiophene polymer. The pyr-SWCNTs/(C60-Pd)-bithiophene film