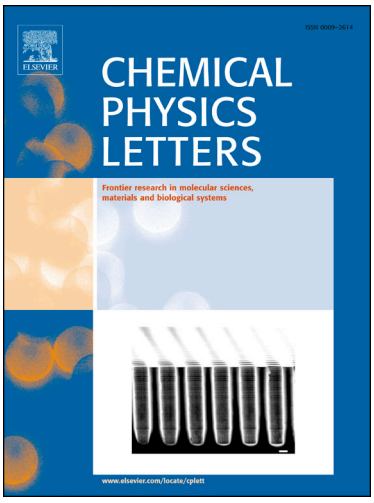

Research paper

Application of electroless deposition for surface modification of the multiwall carbon nanotubes

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Application of electroless deposition for surface modification of the multiwall carbon nanotubes

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Abstract. The paper describes modification of carbon nanotubes surface by attaching the grains of Ni-P, Ni-B, Co-B and Fe-B. The modification was obtained by electroless metallization using sodium hypophosphite (NaH_2PO_2). We have investigated the parameters of electroless metallization process of CNTs. The uniformity of the coating on the carbon nanotubes was related to proper surface activation. While optimizing the electroless deposition, a range of catalyst concentrations from 0.1 to 1.0 gPd/l were tested. Deposition was used to improve the electrical properties of the later composite materials CNT-Ni-P/epoxy. The best results of electroless deposition were obtained for Ni-P and Ni-B coatings.

Keywords: *carbon nanotubes, nanocomposite, electroless deposition, coatings, Pd activation*

1.Introduction

In the 80s of the twentieth (XX) century, the industrial production of the material that we know as multiwall carbon nanotubes was began. However, a huge interest in this material started after 1990, when the paper of Iijma with the description of multiwall carbon nanotubes appeared in Nature. Two years later, the paper written by the same author about single wall carbon nanotubes was published. Next papers describe the unique properties of carbon nanotubes, such as the Young's module approaching 1 TPa [1], [2] a tensile strength of about 60GPa [1], [2] for SWCNT and even 1,5TPa for MWCNT [2]. In addition, the electrical conductivity of carbon nanotubes is up to 10^9 A/cm^2[2], [3] while the thermal conductivity is 2000-6000 W/m K at room temperature [4], [5] but for MWCNT we can observe values around 3000 W/mK. Furthermore, commercially available multiwall carbon nanotubes are characterized by reduced electrical and thermal properties compared to singlewall carbon