NEXAFS STUDY OF COMPOSITE MWCNT/(PYROLYTIC Mo)

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Coating the surface of the multi walled carbon nanotubes (MWCNT) with specific metal films gives them unique physical and chemical properties and leads to the creation of new heterogeneous materials that will have good adhesion to the matrix. Therefore, the development of methods of synthesis and investigations of nanostructured composite material based on MWCNT is an actual problem. Previously in our work were shown the possibility of synthesis on the MWCNT surfaces the nanosize pyrolytic Fe [1] and Cr [2] coating by Metal Organic Chemical Vapor Deposition (MOCVD) growth technique and shown the informatively of the Near Edge X-ray Absorption Fine Structure (NEXAFS) spectroscopy for the experimental investigation of MWCNT/(pyrolytic metals) geterogenous systems. In current work it is demonstrated the possibility of synthesis on the MWCNT surfaces the nanosize pyrolytic Mo coating by MOCVD. The composite MWCNT/(pyrolytic Mo) was prepared by growth technique using as the precursor the molybdenum hexacarbonyl

$\mathrm{Mo(CO)_6}$, which are deposit to the MWCNT surface and decomposed at temperature 240°C with the emission of gas phase. The study of the pristine MWCNT's surface, chemical composition, coating thickness and surface coating interaction was carried out by NEXAFS-spectroscopy method with using synchrotron radiation of RGBL at BESSY-II. The absorption cross section (CS) spectral dependences in the wide energy interval 250–900 eV and $\mathrm{C1s-}$, $\mathrm{Mo3p-}$ and $\mathrm{Ols-}$edges ranges of the pristine MWCNT and composite MWCNT/(pyrolytic Mo) were measured in TEY mode. The samples for studies were prepared by pressing the MWCNT and composite powders into the surface of a pure Cu-plate. For suppression and evaluation of the the second-order and the VUV-stray radiation the additional Ti-film (160 nm) filter was used. The incident photon flux was measured using the clean Au-photocathodes. The incident monochromatic synchrotron radiation (SR) intensity in arbitrary units was obtained by means of the division the TEY signal of Au-plate by the Au atomic CS. The CS in arbitrary units was obtained by means of the division the TEY by the SR intensity. The study has shown that top layers of the MWCNT in composite have no essential destruction; the coating of the MWCNTs surfaces is continuous and consists of $\mathrm{MoO_3}$. The effective thickness of $\mathrm{MoO_3}$-coat on the MWCNT's-surface is equal to 0.81 nm.

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