CHARACTERISTICS OF NANOCOMPOSITES CONSISTING OF MWCNTS DECORATED WITH PD NANOPARTICLES

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The main aim of the carried out investigations was to produce nanocomposites consisting of carbon nanotubes coated with palladium nanoparticles and the characterisation of the obtained material and its properties. High quality multiwalled carbon nanotubes (MWCNTs) with the length of 100÷400 nm and the diameter of 6÷25 nm obtained in advance with Catalytic Chemical Vapour Deposition (CCVD) were employed in the investigations. The MWCNTs were synthesised on a silicon substrate containing a catalyst in the form of a thin film of 2 nm Fe. The growth of the nanotubes was controlled in an oven at a temperature of 750°C for 30 minutes using the mixture of the following gases: C\textsubscript{2}H\textsubscript{4}, H\textsubscript{2}, Ar. Carbon nanotubes - palladium nanoparticles system was fabricated by direct deposition of palladium nanoparticles, produced earlier, onto the surface of multiwall carbon nanotubes. The following research techniques were employed to characterise the structure of the nanotubes and nanocomposites obtained: Scanning Electron Microscopy (SEM), Scanning Transmission Electron Microscopy (STEM), Transmission Electron Microscopy (TEM), Energy Dispersion Spectrometer (EDS), Raman spectroscopy and X-ray Photoelectron Spectroscopy (XPS). The presence of palladium has influence on the electrical properties of the nanocomposite, enhances sensitivity and selectivity of the MWCNTs-Pd system in contact with the chosen chemical substance, and the result is the changing of the conductivity of nanotubes. The MWCNTs-Pd nanocomposite has also special optical and electrochemical properties.

Keywords: Nanocomposites, MWCNTs, Palladium nanoparticles

References:


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