Immobilization of avidin on multi-wall carbon nanotube for biomedical application

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There has been intense interest on carbon nanotubes since their discovery by Iijima in 1991 because of their excellent mechanical, electrical and nonlinear optical properties. These properties made them a potential candidate for nanoelectronics, sensors, electrochemical storage of energy, and high-tech electrical and optical actuator applications. For some of these applications, highly purified carbon nanotubes are necessary. Carbon nanotubes purification methods used involve oxidation by mineral acids to remove catalytic particles and carbonaceous by-products, respectively. The aim of our work is to investigate a material by the formation of complex carbon nanotube for biomedical applications. The functionalization process leads to an important amount of functional groups such as carbonyl, and hydroxyl are introduced by this treatment step. The XPS studies showed a shift in the C 1s peak position and changes in the bands with treatment. There is a clear shift of the main peak towards lower energy side indicating a chemical shift due to the functionalization and immobilization of CNT. These changes can be ascribed to the increase in surface area with functionalization and influence of immobilization with avidin.