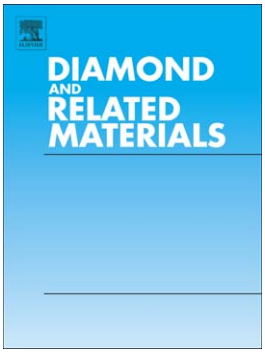

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Novel Growth of Carbon Nanotubes on Nickel Nanowires

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Abstract

A novel growth phenomenon is presented in this paper where carbon nanotubes (CNT) were grown successfully on nickel (Ni) nanowire using chemical vapour deposition technique. The decomposed carbon from ethylene diffused through the surface of nanowires and precipitated into hollow cylindrical carbon structures. Nanotubes of various lengths are found to have grown along the length of the outer side of the nanowires and were firmly rooted to their walls. The presence of a thin layer of oxide (~3 nm) on the top surface of nanowires is believed to have promoted the growth of CNT. Raman, X-ray photoelectron (XPS) and electron energy loss spectroscopy (EELS) were conducted in order to understand the formation of nanotubes and verify their presence, their level of crystallinity and chemical bonding structure with nanowires. This hybrid nanostructure is also found to have ferromagnetic behavior, which can be applied in devices such as magnetic sensors and spintronic devices that combine the unique properties of CNT and Ni nanowires.

Keywords: Anodized aluminium oxide (AAO), Carbon nanotubes, Electrodeposition, Nickel nanowires