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Buffer Film Assisted Growth of Dense MWCNTs on Copper Foils for Flexible Electrochemical Applications

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Abstract

The novel Inconel buffer films were prepared on copper foils using unbalance direct current (DC) magnetron sputtering. These films were employed as buffer layers for supporting the dense growth of multiwalled carbon nanotubes (MWCNTs). Thermal chemical vapor deposition (CVD) with metal alloys such as stainless steel (SS) type 304 films was considered to synthesize MWCNTs. To understand the effectiveness of these buffer films, the MWCNTs grown on buffer-free layer were carried out as a comparison. The main problem such as the diffusion of catalysts into the oxide layer of metal substrate during the CVD process was solved together with a creation of good electrical contact between substrate and nanotubes. The morphologies, crystallinities, and electrochemical behaviors of MWCNTs grown on Inconel buffer films with 304 SS catalysts revealed the better results for applying in flexible electrochemical applications.

Keywords

KeyWords Plus: CHEMICAL-VAPOR-DEPOSITION; MULTIWALLED CARBON NANOTUBES; STAINLESS-STEEL; CATALYTIC GROWTH; LAYER; ELECTRODES; ARRAYS; TEMPERATURE; ALUMINUM; FOREST

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