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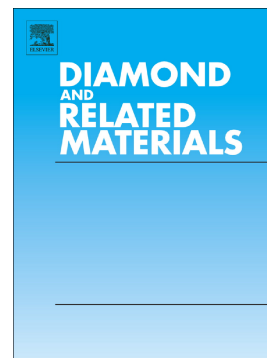
Direct growth of coiled carbon nanofibers without nanocatalyst

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Abstract

The paper presents the coiled carbon nanofibers growth on bulk metals without use of nano catalyst on indigenously developed custom build Chemical Vapour Deposition (CVD) set-up. Transition metal and alloys as substrate were investigated for their effect on morphology during growth of carbon nanofibers. The application of Inconel proved as a very good substrate for homogenous coiled nanofibers growth. Effects of variation in temperature and gas flow ratio were studied on diameter and helix angle of synthesized carbon nanofibers on Inconel as substrate. Experimental results reveal that the range of diameter of carbon nanofibers was 80-150 nm. Transmission electron microscopy (TEM) analysis shows stacked-cup type structure with amorphous carbon deposits on carbon nanofibers. As the CVD process is very simple and economical, hence, this process can be effectively used for direct growth of carbon nanofibers.

1. Introduction

The attractive properties of carbon and its allotropes have been attracting the metallurgist and scientist for extensive research in the area almost two and half decades. Carbon nanotubes, carbon fibers, diamonds and graphene being the most reported allotropes. Carbon filaments with diameter in nanometers are classified as carbon nanotubes (CNTs) or carbon nanofibers (CNFs).

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