INSTITUTO TECNONÓLOGICO Y DE ESTUDIOS SUPERIORES DE MONTERREY

MASTERS THESIS PROPOSAL

Design of Polymer Solutions for the Fabrication of Conducting Carbon Nano-wires

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A thesis proposal submitted in fulfillment of the requirements for the degree of Master of Science in Nanotechnology (MNT)

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Supervising Committee

The committee members, hereby, recommend that the proposal by Antonio Osamu KATAGIRI Tanakato be accepted to develop the thesis project as a partial requirement for the degree of Master of Science in Nanotechnology (MNT).

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Design of Polymer Solutions for the Fabrication of Conducting Carbon Nano-wires

by Antonio Osamu KATAGIRI Tanaka

Carbon nano-wires are versatile materials composed of carbon chains with a wide range of applications due to their matchless properties in electrical matters. Regardless of the high interest in the implementation of carbon nano-wires in several applications and devices, no feasible processes have been developed to synthesize carbon nano-wires. Carbon nano-wires have been fabricated with the use of a photoresist, but little is known about polymers that can produce more conductive carbon nano-wires after pyrolysis. Various polymer solutions have being tested and measured through near field electrospinning (NFES) and photopolymerization processes; it was found that it is not possible to predict the behaviour of the electrospinning process, so additional properties are to be considered to achieve a stable manufacturing process. The thesis proposal is to analyse the rheology of different polymer solutions to determine if they can be easily electrospun at low voltages and then fabricate nanowires with them. The research process will include the design of polymer solutions that can be electrospun, photopolymerized, and then pyrolyzed into conducting carbon nanowires. The research is intended to engineer a newly designed polymer solution to achieve mass scale manufacturing of carbon nano-wires in a cheap, continuous, simple and reproducible manner.

keywords: nanotechnology, carbon, nano-wires, electrospinning, NFES

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