

Chapter One

Introduction

1.1 Nano Science

Quantum physics is one of the most important branches of physics that changes radically understanding the nature of atoms and matter. It shows to us how to play with atoms so as to change matter properties to meet technology needs. These changes include forming alloys, crystals, and doping process. Most of mechanical properties result from annealing and alloys. The electrical properties can be controlled by doping.

The development of quantum mechanics open new doors to control matter properties. One of them was initiated by Feynman. He said that if aggregates of atoms are isolated from each other on a very small scale, their behaviour obeys quantum laws. Thus one can change their properties by changing their structure and orientations. This branch of science is now known as nanoscience. Nano science is related to nano scale which is equal to one part of a metre when it is divided to thousand million equal parts. The nano particles are aggregates of isolated particles in the range of (1-300nanometre).

Nano science is now widely used in wide variety of applications, in electronics, electricity, industry and biology. Recently attention was paid to use nano science in transportation, by replacing fuel cars by those using electric power. This is due to the severe environmental pollution caused by petrol fuels. This requires using light and large capacity batteries. One of the promising one is the nano carbon tube batteries. These tubes should be pure so as to work more efficiently.

Carbon nanotube (CNT) powder normally is not pure, because it contains particles of carbonaceous materials (amorphous carbon particles, fullerenes and nonocrystalline polyarmatic shells) and metal catalysts (generally compounded by Co, Ni or Fe) . A large variety of methods such as physical separation, gas and liquid phase oxidation and combinational purification have been emerged to purify the CNT [1] . Purification processes involving physical and chemical oxidation of the CNT have been extensively investigate [1-4.]These processes are based on the fact that the oxidation temperature of carbonaceous particles is different from that CNT in air or oxygen [5]. However, persistent problem, associated with physical oxidation is that materials such transition metal catalysts that remain encapsulated in the wall structure can affect performance in many applications [1]. Physical

separation is useful for the preparation of small amounts of purified coupons Gas-phase oxidation is not efficient for the removed of graphitic impurities and catalyst particles [2]. On the other hand liquid-phase oxidation is effective in removing both amorphous carbon and metallic catalyst particles. Oxidant common used in liquid phase are HNO_3 and mixture of $\text{H}_2\text{SO}_4:\text{HNO}_3$ [3] .The problem with this method is that the acid can react with the surface and insert functional groups, those can cut and open of CNT walls. Thus non oxidative acid treatments with HCL have been also employed to purify CNT [1].This work is devoted to study optical characteristics of petrol carbon waste after treated by acids . Sections 1&2 are concerned with introduction and materials, while sections3&4 are devoted for discussion and conclusion.

1.2 Research Problem:

The research problem stems from the need to extract carbon powder from locale materials to improve performance. There is a need also to minimise the cost and to search for easy fabrication techniques.

1.3 Aim of the Work:

The aim of this work is to study the properties of locally available carbon powders to see how one can improve their properties to be used in industry.

1.4 Thesis Lay Out

This thesis consists of four chapter's .Chapters one and two are concerned with introduction and literature review. Chapters three and four are devoted for materials methods beside discussion and conclusion.