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INCREASING TRANSMISSION LINE STRENGTH USING SINGLE WALLED NANO-TUBE

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ABSTRACT

In this research presentation, discuss about increasing the transmission line strength. A transmission line is a pair of electrical conductors carrying an electrical signal from one place to another. EHV /UHV power transmission is widely using in present as well as future aspect. Now a day, the research on UHV and EHV power transmission because, when the excessive amount of over-current fault comes. It may cause of short-circuit, creak or break in the transmission line. And recovery for this on the other hand measures it will cause a lot of money. And time to time repairmen required. That's way for long transmissions SWNT (single walled nano-tube) used in the UHV/EHV power transmission lines. Carbon nano-tubes (CNTs) have demonstrated versatile applications due to their exceptional mechanical, electrical and thermal properties. This novel material has attracted great interest not only in scientific fields but also in the field of nanotechnology applications, such as electronic devices and energy related applications.

KEYWORDS: *EHV/UHV Power Transmission, SWNT (CNT s)*

I. INTRODUCTION

In this paper the main focusing on characterizing transmission power and increasing strength of transmission power cable, using nano-technology in which we are deals with nanometer and provide high scale of reliability. And also helps to increasing the scale of strength of transmission line. SWNT (Single walled nano-tube) is as an electrical conductor, we using in main category of electrical core cable. Because it carries the conductivity how is almost 3500w/mk. When compared to the conductivity of copper, a known thermal conductor with a conductivity of 385w/mk. That's way we implemented SWNT (single walled nano-tube) for in power transmissions, power distributions.

II. MOLECULAR STRUCTURE OF THE MATERIAL

Carbon nano-tubes (CNTs) have demonstrated versatile applications due to their exceptional mechanical, electrical and thermal properties a Carbon nano-tube have two types of bonds. Along the cylinder wall the σ bonds Form the hexagonal network, which is found in graphite in its pure form. And other the π bonds Point perpendicular to the nano-tubes surface, shown in Figure. They are responsible for weak van-der-Waals interaction between tubes. The bonding and anti-bonding π band, in contrast, cross at the Fermi level. They make graphene (carbon consisting of planar sheets which are one atom thick) and one third of carbon Nano-tubes metallic or quasi-metallic.

For these nano-tubes, the electronic structure strongly depends on the chirality's vector defining the types of nano-tubes: $(n; n)$ tubes (armchair- type) are predicted to be metallic, while $(n; m)$ tubes with $n \neq m$ are wide-gap or narrow-gap semiconductors, depending on the particular m and n. if ($2n+m$ or $n+2m$) is integer multiple 3 then.

The SWNT is predicted to be a narrow-gap Semiconductor with good room-temperature conductivity. The behavior can be understood in a straightforward quantum confinement approach starting from the band Structure for a single graphene sheet. The capability of this material of good conducting capability is fetch out is this under the categories of transmission cables. Here the figure of the sheet.

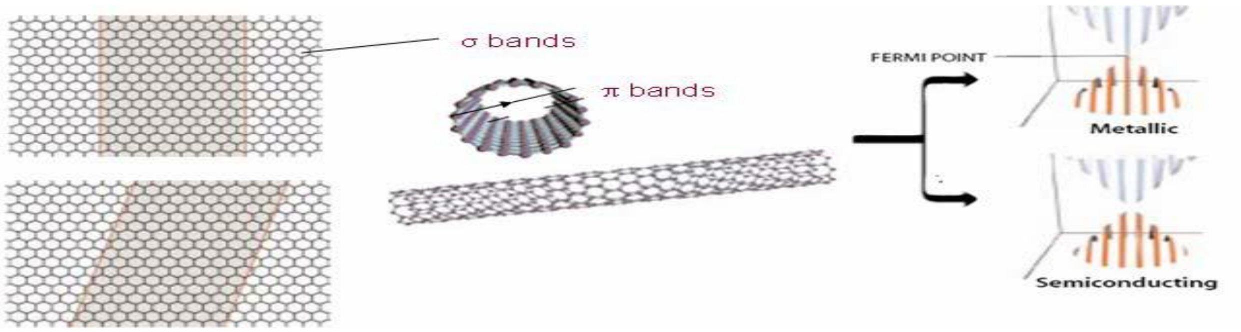

Figure 1. Carbon nano-tube at conducting stages

III. ELECTRICAL CONDUCTIVITY OF THE MATERIAL

On considering the electrical conductivity in SWNT, that is approximate 1×10^5 s/m. and that is obtained by (four-probe) method. This is the method in which we observing the behavior of current- i and voltage- v also nature of the characteristic's as shown in the figures

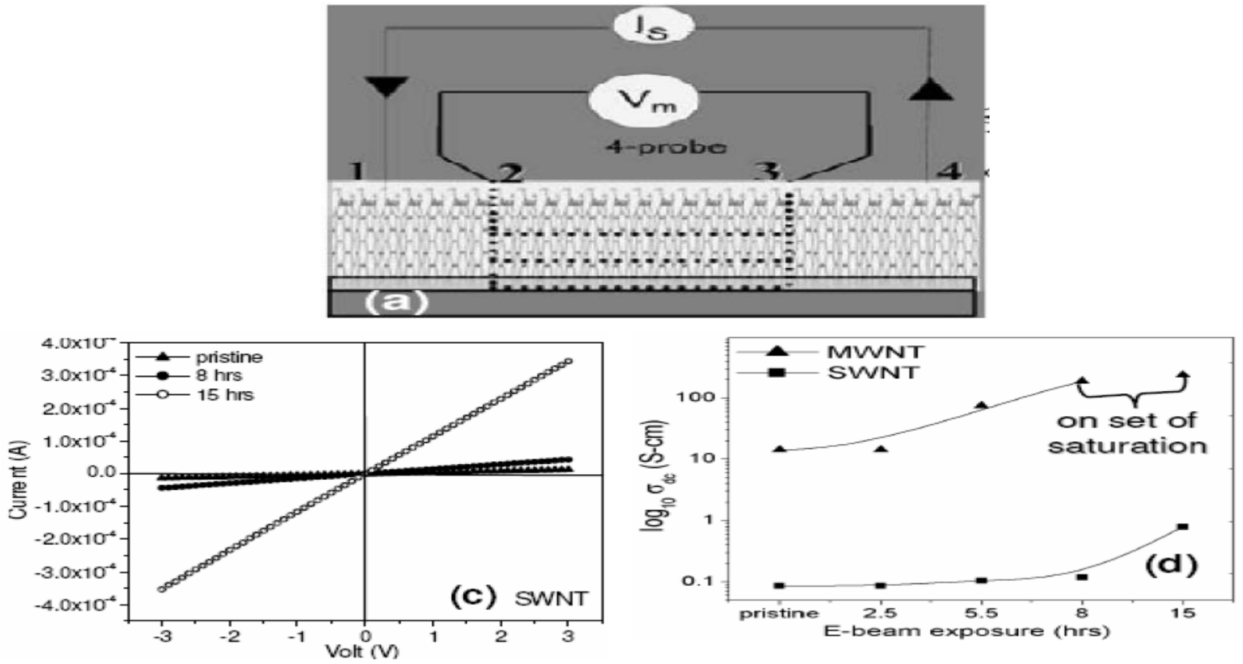

Figure 2: (a) Schematic of four-probe used to measure I-V curves (b) I-V Characteristics (c) dc electrical conductivity is determined SWNTs prior to and post-irradiation times of 2.5, 5.5, 8, and 15 hours

Also as we know that this single walled nano-tube material have high temperature stability up to 350^0c and good tensile strength upto150 (Gpa) as compare to steel it had only 0.4(Gpa). At this temperature and tensile strength the conductivity of the material is 1.3×10^5 s/m and 0.9×10^5s/m, respectively we have some data that to describe that how much conductivities it carries in different matters and material in nano-tube.

Table no-1 Electrical Conductivities of SWNT Films

Electrical Conductivities of SWNT and SWNT Films	Electrical Conductivity (S/m)
Individual SWNT rope	1.0×10^6 ~ 3.0×10^6
Individual MWNT rope	1×10^3 ~2.0×10^3
As-prepared SWNT film	1.3×10^5
Heat-treated SWNT film	0.9×10^5
SWNT mat (Buckypaper)	2×10^5 ~ 4×10^4

IV. CONCLUSION

Basically this idea is come in my mind to protecting those aspects who suffers from electricity shock. When the transmission line break down to the earth-surface due to faulty reasons and poor mechanical strength of the material. So that as per future assumption this material has to be taken by improving the electrical conductivity of bulk polymers is important in a number of applications. For example, in some aircraft components, enhanced conductivity is required to provide electrostatic discharge (ESD), and electromagnetic radio frequency interference protection (EMI). For the purpose of ESD or EMI shielding, a certain level of electrical conductivity is required. It is reported that the electrical conductivity of above 10 E-8 S/cm is needed in order to avoid the electrostatic charging of insulating matrix. For example, some research groups like Sandler et al. dispersed CNTs in an epoxy resin and measured electrical properties of the nano composites to reveal the relationship between the filler volume fraction and the electrical conductivity. They showed that the nano composites had a conductivity of about 10 E-4 S/cm with the filler volume fractions as low as 0.1 wt. consequently the single walled nano-tube is implemented to improvising the strength of EHV/UHV power transmission.

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