

Study of Carbon Nanotube Antennas

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Abstract:

Recently Carbon Nanotubes (CNTs) received a lot of attention from antenna community due to its unique electrical and chemical properties, extraordinary of low weight, efficient conductors of heat, suitability to be printed on the paper which allows deposition of different materials on any discretionary substrates and creates flexible antennas [1,2]. With the advancement of CNT creation system, CNT has been utilized in inkjet printing for the applications like RFID.

In order to show the superiority of the CNT-based antenna over the conventional antenna, we designed a CNT-based antenna and showed its behavior with different bending conditions. This antenna has been simulated using microwave studio CST software.

In this paper, we will investigate the antenna characteristics for microstrip antennas such as return loss, gain, radiation pattern, and efficiency with CNT and with traditional copper. At the same condition, we will compare the performance of these two antennas to be used for wireless communication. We will perform the bending and discuss the results of using the CNT for antenna fabrication. We will present the results of efficiency and thermos mechanical characteristics and stability for CNT antenna. To the best of our knowledge, such a study about CNT has not been performed. The result of this paper can be also useful for different applications such as sensor designs and RFID applications.

References:

- [1]. G. W. Hanson, IEEE Trans, AP, 53, 11, 3426-3425, 2005.
- [2]. Li Yang, et al., IEEE AWPL, 9, 653-656, 2009.