Paper ID: 30658
student

EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations (IP)

Author: Mr. Hitesh Agarwal
Birla Institute of Technology and Science(BITS), India, hiteshagarwal995@gmail.com

Mr. Pinakin Padalia
Birla Institute of Technology and Science(BITS), India, pinpad9@gmail.com
Mr. Parth Garg
Birla Institute of Technology and Science(BITS), India, gargparth7@gmail.com
Ms. Anamika Aggarwal
Birla Institute of Technology and Science(BITS), India, f2012697@pilani.bits-pilani.ac.in

ANALYSIS OF CNT BASED IR DETECTOR FOR SPACE APPLICATIONS

Abstract

Infrared (IR) detection is a primary subject in optical sensing and is critical for a variety of industrial, military and scientific applications, including monitoring and controlling manufacturing process, optical communication, biological and military night time sensing. This paper demonstrates Carbon nanotubes (CNTs) as promising candidates for future IR detectors due to their unique band structure, excellent electronic and optoelectronic properties, and super mechanical and chemical stabilities. The paper also analyses a Single-Walled CNT (SWCNT) arrays based photovoltaic infrared detector which can map density of different wavelength spectrum within Infrared region exploiting the property of multi chirality and tunable band gap of CNTs. With extraordinary electrical and mechanical properties the above sensor has also been proposed for its application in space as a low cost and effective Infrared detector. The paper also presents a detailed comparison of various composite materials (i.e. made of two components, a light sensitive component and Carbon Nanotube) on the basis of their electronic properties, fabrication process, production cost and efficiency in order to suggest a suitable material for the Infrared detector. Finally, a feasibility study of the above sensor in space hardened environment and satellite constraints has been presented along with other viable future applications of Carbon Nanotube sensors in space.