IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 8, May 2024

Chemical Physics of Carbon Nanotubes: Recent Progress and Future Directions

Ganesh B. Akat[1] and Balwan U. Patil[2]
Department of Chemistry, Kohinoor Arts, Commerce & Science College, Khultabad, Chhatrapati Sambhajinagar[1]
Department of Physics, Kohinoor Arts, Commerce & Science College, Khultabad, Chhatrapati Sambhajinagar[2]
ganeshbakat@gmail.com

Abstract: *Carbon nanotubes (CNTs) have garnered significant attention due to their unique structural, mechanical, electrical, and thermal properties, making them promising candidates for a wide range of applications in various fields. This review article provides an overview of recent progress in understanding the chemical physics of carbon nanotubes and discusses future directions in this rapidly evolving field. We begin by summarizing the synthesis methods of CNTs, including arc discharge, laser ablation, and chemical vapor deposition, highlighting recent advancements and challenges. Subsequently, we delve into the structural characterization techniques employed to study CNTs, such as transmission electron microscopy, scanning electron microscopy, and atomic force microscopy, emphasizing recent developments in high-resolution imaging and spectroscopic techniques. We then discuss the electronic properties of CNTs, including their band structure, electrical conductivity, and quantum transport phenomena, and review recent theoretical and experimental studies aimed at elucidating these properties. Furthermore, we explore the chemical functionalization of CNTs and its impact on their properties and applications, including enhanced solubility, biocompatibility, and chemical reactivity. Finally, we outline future directions in the field of CNTs, including the development of scalable synthesis methods, the integration of CNTs into functional devices, and the exploration of novel applications in areas such as nanoelectronics, energy storage, and biomedicine.*

Keywords: Carbon nanotubes, chemical physics, synthesis, characterization, electronic properties, functionalization, applications, future directions

ISSN 2581-9429 IJARSCT