RESEARCH FIELD
Solid state physics, surfaces and interfaces / Physique de l'état condensé, chimie et nanosciences

TITLE
Hybrid carbon nanotube optoelectronic devices for silicon photonics

ABSTRACT
Thanks to their outstanding electrical, mechanical and chemical characteristics, carbon nanotubes have been demonstrated to be very promising building blocks for future nanoelectronic technologies. In addition, recently their optical properties have attracted more attention because of their typical fundamental optical transition in the NIR [1-2] in a frequency range of interest for the telecommunications. The idea is to combine their particular optical features, inferred by their one-dimensional character, with their assessed exceptional transport and mechanics characteristics for hybrid optoelectronics/optomechanics application [3-5]. However, before that this can be realized some fundamental studies are necessary. Here, we will consider the mechanism involved in the electroluminescence and photoconductivity: both the carrier injection and the mechanisms leading to radiative recombination are to be considered. We will perform studies onto semiconducting nanotubes that we will extract from the pristine mixture by a method based on selective polymer wrapping [6-14]. Then, hybrid opto-mecnichal integrated devices will be considered. This will be realized thanks to the expertise of the associated laboratories. CEA-LICSEN (Laboratory of Innovation in Surface Chemistry and Nanosciences) is part of the DRF (Fundamental Research Department) division of CEA and develops pioneer research in molecular electronics and surface chemistry, with specific know how in carbon nanotubes and their nanofabrication and self-assembly techniques. CEA- LETI (LCO) (Laboratoire des Capteurs Optiques et Nanophotonique) is part of the LETI at CEA Tech (Technological Research Department) division of CEA which is specialized in nanotechnologies and their applications, with specific know-how in photonic, nano-systems (NEMS) and optomechanics.


LOCATION

Institut rayonnement et matière de Saclay
Service Nanosciences et Innovation pour les Materiaux, la Biomédecine et l'Energie
Laboratoire Innovation, Chimie des Surfaces Et Nanosciences
Place: Saclay
Start date of the thesis: 01/10/2019

CONTACT PERSON

Arianna FILORAMO
CEA
DRF/IRAMIS/NIMBE/LICSEN
Laboratoire d'Innovation en Chimie des Surfaces et Nanosciences
Bât.125 Pce 153
CEA Saclay
91191 Gif sur Yvette
Phone number: +33 1 69 08 86 35
Email: arianna.filoramo@cea.fr

UNIVERSITY / GRADUATE SCHOOL

Paris-Saclay
Physique et Ingénierie: électrons, photons et sciences du vivant (EOBE)

FIND OUT MORE

http://iramis.cea.fr/nimbe/Phocea/Membres/Annuaire/index.php?uid=filorama
http://iramis.cea.fr/nimbe/LICSEN/

THESIS SUPERVISOR

Arianna FILORAMO
CEA
DRF/IRAMIS/NIMBE/LICSEN

Commissariat à l’énergie atomique et aux énergies alternatives
Institut national des sciences et techniques nucléaires
www-instn.cea.fr