



COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering, Cairo

Graduation Project Description Form

Project Title:

Design of Organic Solar Cells

Project Supervisor(s):

Prof. Dr. Khaled Shehata (EC. Dept., College of Eng., AAST, Cairo)

Dr. Hanady Hussein (EC. Dept., College of Eng., AAST, Cairo)

Duration from mo/year: 2/2013 till mo/year 2/2014

Product Category

Algorithm _____ Hardware _____ Software _____ Circuits & Devices: **X**

Standards:

Safety: UL, CE _____ IEEE _____ FCC _____ Other _____

Practical Realization Form

PCB _____ Firmware _____ Embedded CPU Kit (ARM, ..etc): _____

PC Software _____ Ready-made Package: **X** DSP Kit _____ FPGA Kit _____

VLSI Schematics **X** VLSI Layout **X** VLSI Silicon (ASIC) _____

Language

VHDL/Verilog _____ Matlab **X** C/C++/Java _____

Productization

Finished Product Form: _____ Possible Commercialization _____

Amount of funds needed for buying components: _____

IEEE GOLD Made-In-Egypt/Engineering Day: _____

ITAC (ITIDA) or NTRA Funding Application: _____

Testing

Functional _____ Simulation **X** Parameters _____ Final Hardware _____ Other: _____

Lab Test Setup

EMC _____ Environmental _____ Microwave _____ Analog Lab _____ Other: _____

CAD Tools (*No unauthentic software is allowed*): Circuit Simulators for Organic Electronics

Elective Classes Required:



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Abstract

Design of Organic Solar Cells

Prof. Dr. Khaled Shehata / Dr. Hanady Hussein

There has been an intensive research for cost-effective photovoltaics since the development of the first silicon-based p-n junction solar cells in the 1950s. Solar cells made from inorganic semiconductors have been used as renewable electric power sources in applications ranging from satellites to residential roof-tops since the 1960s.

Among all the alternative technologies Organic Solar Cells are the most significant cost effective. Recently, several types of solar cells based on organic materials have appeared, raising the intriguing possibility of inexpensive solar cells that can be made on flexible substrates. There are some well-known differences between the photo conversion mechanisms in inorganic photovoltaic (IPV) cells and in organic photovoltaic (OPV) cells; most obviously, that light absorption in OPV cells leads to the production of exactions (mobile excited states) while in IPV cells it leads directly to the creation of free electron-hole pairs.

The aim of this project is to explore different technologies of OPV and their characteristics. Design an OPV and study the effect of different organic materials on its energy conversion efficiency.

References and Links