



GIAN @ MK University,
Madurai
Two -Week Course on
Solar cells, materials and modelling
29 May 2017 to 10 June 2017



Department of Materials Science
School of Chemistry
Madurai Kamaraj University
Madurai-625021
Tamilnadu , India.

Overview

Solar radiation as a renewable, green energy resource has an enormous potential to meet the global needs of primary energy. The energy can be converted into electrical energy by solar cells and development of cost effective cells, materials and technology are important. Several types of solar cell technologies exist with different advantages and disadvantages in terms of cost, efficiency and durability and new contenders have emerged.

The aim of this program is to give a two-credit course for two weeks. It is to be provided in two modules. Module I is aimed to cover the basic aspects of photovoltaic technology : Introduction to solar cells, generations of solar cells, wafer-based and thin film solar cells, new materials for solar energy conversion, hybrid solar cells, charge transport, generation recombination processes and solar modules. Module II will provide hands-on training in *ab initio* modeling of materials and devices in solar cell technology. The course is multidisciplinary and emphasizes the combination of competence on photovoltaic technology, materials science and computational physics. The course is relevant for participants with background in physics, chemistry, materials science and photovoltaic technology. No specific prior knowledge on photovoltaic technology or *ab initio* modeling is required.

Course Objectives

- * To develop the educational content and resources on photovoltaic technology and first principles calculation; for Master, PhD students and young researchers.
- * To provide hands on training on materials synthesis and characterization as well as on fabrication and characterization of dye sensitized and organic solar cells.
- * To provide background knowledge on using the first-principles calculations in the study of materials properties as well as on using modeling to study solar cell structure.
- * To provide hands on *ab initio* modeling and device modeling.
- * To comprise a modern vision on advanced concepts on solar cells, solar cell design, materials for solar cells and theoretical modeling.

Who can attend?

- ◆ Students at all levels (PG / Ph.D) of Physics and Materials Science or Faculty from reputed academic institutions and technical institutions.
- ◆ Engineers and researchers from manufacturing, service and government organizations including R&D laboratories.

Important dates

Last date for receiving application: **1 May 2017**
Intimation to participants: **10 May 2017**
Course date: **29 May 2017 to 10 June 2017**

Registration details

The above fees include all instructional materials, computer use for tutorials, 24 hr free internet facility and lunch. The participants will be provided with single bedded accommodation on payment basis.

Participants	One module	Complete Course
Foreign Participants	USD 150	USD 200
Industry / Research Organizations	Rs. 1000/-	Rs. 1500/-
Academic Institutions	Rs. 500/-	Rs. 750/-

Teaching Faculty: Dr. Smagul Karazhanov



Dr. Smagul Karazhanov is mainly involved in scientific research related to theoretical study of materials to be used in photovoltaic technology and chromogenics. He presented many plenary lectures, invited presentations in different International Conferences, Universities, companies, and lectures such as "The physics of solar cells", "Materials to be used in solar cells and smart windows", as well as on "Computational Materials Science".

Course Co-ordinators



• **Professor R. Saraswathi** is heading the Department of Materials Science and is an expert in Electrochemistry and Nanoscience. She has completed eight major research projects related to materials development for electrochemical energy storage, sensors and biosensors for monitoring environmental pollutants like heavy metal ions, pesticides and organic vapours, photocatalytic degradation of organic dyes and conjugated polymer-fullerene molecular hetero junction solar cells and dye-sensitized solar cells. She is also actively engaged in curriculum development, teaching and research supervision.



• **Dr. Jeyanthinath Mayandi** has got his PhD (Physics) from University of Oslo, Norway. He was employed as a Research Scientist at IFE, Norway for 2 years (2008-2010) and engaged in research on silicon solar cells. At Madurai Kamaraj University, he has initiated research on porous silicon solar cells, materials development for LED and non-linear optics. He continues his research collaboration with IFE and University of Oslo in the field of solar energy materials. He has authored several articles in the relevant field in reputed journals.