



MENA 9550 - Advanced characterization methods

Course content

The course on advanced characterization methods is organized within the Research School at the Norwegian Research Centre for Solar Cell Technology (FME-SOL). It will include the techniques relevant for characterization of materials and components for solar cells. The course emphasis is on hands-on exercises. An introduction to each technique will be supervised by an expert in this technique. The course is divided in 4 modules: (i) *Structure and composition of solar-grade materials*, (ii) *Optical characterization of semiconductors for solar cells*, (iii) *Electrical characterization of solar cell materials*, and (iv) *Characterization of silicon wafers and solar cells*.

When: October 4th-8th and October 25th-29th 2010 (weeks 40 and 43)
Where: University of Oslo
Target group: PhD students, researchers from industry and institutes
Credits: 5

Registration

To sign up for the course, please send an email to vebjorn.bakken@kjemi.uio.no by September 17th.

Description of modules:

1. *Structure and composition of solar-grade materials*
Within this module the participants will be introduced to techniques for the analysis of structure, chemical composition and trace impurities in materials relevant for solar cells: X-ray photoelectron spectroscopy (XPS) and secondary ion mass spectrometry (SIMS).
2. *Optical characterization of semiconductors for solar cells*
Optical characterization will be performed by photoluminescence (PL) and Fourier transform infrared absorption (FTIR).
3. *Electrical characterization of solar cell materials*
Electrical characterization techniques will include capacitance-voltage characteristics (CV) and deep level transient spectroscopy (DLTS).
4. *Characterization of silicon wafers and solar cells*
In this module, carrier life-time and quantum efficiency measurements will be performed.

Learning outcomes

The students are expected to understand fundamental principles of the techniques presented in the course, their advantages and limitations. Furthermore, the student should understand the requirements for samples suitable for each technique. They should also be able to perform simple characterization measurements with no or little assistance from the experts.

Exam

One month after the teaching is finished a project report should be handed in.

Recommended literature

Dieter K. Schroder: *Semiconductor Material and Device Characterization*