



## SEMINAIRE EXCEPTIONNEL

de 11 h à 12 h, salle Belledonne, IMEP-LAHC, MINATEC,  
(ouvert à tous : enseignants, étudiants, chercheurs, administratifs, techniciens)

Mercredi 17 juin 2015

“Short overview of electrical and optical measurements of solar cells in  
Tallinn University of Technology”

by Erkki KASK

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**Abstract:** The increase of energy prices, increasing energy consumption and a lack of fossil fuels reminds the need of alternative energy sources. This has also resulted in the increase of studies in the field of solar energy. The research in our lab at Tallinn University of Technology is mainly directed to the development of several new technologies of preparing chalcopyrite solar cell semiconductor materials included in thin film and monograin layer solar cells. Used absorber materials are multinary compounds such as  $\text{Cu}_2\text{ZnSnS}_4$  (CZTS),  $\text{Cu}_2\text{ZnSnSe}_4$  (CZTSe) and their solid solutions  $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$  (CZTSSe) and other.

To produce more efficient solar cells, the characterisation of the defect levels in the prepared solar cells is needed. This can be done by capacitive measurements methods, like C-F, C-V and admittance spectroscopy. Admittance spectroscopy is effective and non-destructive method for studying the defects in solar cells. Without understanding the basic physical properties of absorber materials it will be impossible to make a breakthrough and show higher efficiencies. It is known that intrinsic point defects in absorber are playing a major role and determine the properties of it. This is why more defect studies are needed.

The presentation will also cover different electrical and optical measurements possibilities of solar cells at Tallinn University of Technology, i.e photoluminescence, admittance spectroscopy, C-F, C-V measurements etc.

*Erkki Kask is 30 years old. From year 2005, he started Bachelor studies at Tallinn University of Technology (Curricula Engineering Physics). I continued with Master studies and started working mostly with  $\mu$ -Raman and electrical measurements of solar cells. Master thesis was about  $\mu$ -Raman spectroscopy applications for optical measurements of quaternary compounds. I have continued with electrical measurements of solar cells during my doctoral years. I have mostly worked with solar cells based on CZTS, CZTSe, CZTSSe and some CdTe absorber materials. The topic of my PhD dissertation work is mainly to study multinary compounds CZTS, CZTSe and CZTSSe by capacitance spectroscopy methods. Mostly I have studied defects of solar cells and absorber materials by using admittance spectroscopy.*

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