

The Electrical and Computer Engineering Program presents
ECEN Seminar Series

Structuring Si Surface for Light Management in Crystalline Si Solar Cell

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Thursday, 11th May, 2017

12 – 1 PM

Lecture Hall 143

With its indirect band structure and good reflecting properties, Si is a poor absorber particularly in the infrared part of the light spectrum. Thanks to surface texturing technologies, absorption and photocurrent generation can be significantly improved by a management of light using surface structures at micro and nanometer scale. Surface texturing can be done by wet and dry chemical etching or laser ablation. Metal Assisted Etching (MAE) is an electrochemical etching technique in which metal nanoparticles are used as catalyst in controlling the shape of the surface structures. It has been applied to solar cells with industrial size and evaluated for its applicability and performance in the energy conversion process. It is understood that optical gain due to the enhanced absorption is compensated by the electronic losses due to the high recombination at the textured surface with large area. Gain/loss ratio can be improved to some extent by controlling the surface shapes with solution chemistry. Use of laser is an alternative and dry approach for structuring the surface of Si. Black Si with almost no reflection can be fabricated using laser ablation operating at 1064 nm.



Dr. Raşit Turan completed the B. Sc. and M. Sc. degrees at the Physics Department of Middle East Technical University (METU), Turkey. He received his Ph.D degree from the University of Oslo, Norway in 1990. He worked as Post. Doc. at Linköping University, Sweden. He joined METU Physics Department as faculty member in 1991. He worked as a visiting scientist at the Material Science Department of Toronto University, Canada in 1996. His main research interests have been physics and technology of semiconductor materials and devices including solar cells. He has published more than 160 scientific papers in this field in the internationally recognized journals. He has supervised 7 Ph.D. and about 20 M.Sc. studies. Raşit Turan has coordinated many national and international projects. Among them, European FP6 projects SEMINANO, and METU-CENTER have been among the largest research and support projects coordinated by Dr. Turan. In 2009, he founded a new research center called Center for Solar Energy Research and Applications (GÜNAM) on METU campus. GÜNAM has attracted nationwide and international attention. Recently, a national solar energy system development project, called MILGES, has been given to the consortium where GÜNAM is a key member for solar cell development. He is a collaborating PI on the Qatar National Research Fund (QNRF) project called "Smart PV Skin: Grid-Connected, Non-Planar Photovoltaic Systems".

FOR MORE INFORMATION:

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