EPFL STI IMT-NE PV-LAB

Seminar

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MT 2 11.00

Rue A.-L. Breguet 2, CH-2000 Neuchâtel

Silicon misconceptions and misnomers in solar cells

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ABSTRACT

This seminar proposes the adoption of a new terminology for silicon solar cells. Some of the terms currently in use do not reflect the physics and are, therefore, misleading. Names such as the so called "emitter" and the "Back Surface Field" perpetuate old misconceptions about the role of the highly doped n^+ and p^+ regions commonly implemented at the front and back surfaces of silicon solar cells. We describe here how these regions can be represented by means of recombination current pre-factors J_0 and, through exemplary cases, we show that electric fields are inconsequential to solar cell operation. The actual function of the n^+ region in a photovoltaic device is to collect electrons. Similarly, the principal function of the p^+ region is to collect holes, selectively allowing their passage towards the metal contact. It is timely to adopt an appropriate terminology where the n^+ and p^+ regions are called *electron collector* and *hole collector*, respectively.

Andres Cuevas has contributed to the development of silicon solar cells since 1976, first at the Universidad Politecnica de Madrid, where he obtained the PhD degree in 1980 and then at Stanford University, where he was a Fulbright Fellow. In 1993 he joined The Australian National University, where he is Professor of Engineering. His current research interests include the theoretical modelling of solar cells, the characterisation of the fundamental properties of silicon, with emphasis on low purity and compensated materials, the passivation of silicon surfaces using dielectric coatings, and the development of new device structures and fabrication technologies. This research has been described in 300 scientific publications.