



Call for Abstracts

Area 1: Fundamentals and New Concepts for Future Technologies

Dear Colleagues,

On behalf of the technical program committee it is my pleasure to invite you to submit papers for Area 1: “**Fundamentals and Concepts for New Technologies**” of the **35th IEEE Photovoltaic Specialists Conference**, which will be held in **Honolulu, Hawaii, June 20-25, 2010**. The IEEE PVSC meeting is the established international platform for presenting PV related research of high scientific level.

The development of the photovoltaic industry over the past decade has been truly remarkable. However, much work remains if we are to be able to sustain this type of growth over the decades to come. Papers are sought for Area 1 that describe basic research in physical, chemical and optical phenomena, new materials, and novel device concepts, which are essential to feed the innovation pipeline leading to future-generation PV technologies.

We would like to devote Area 1 to recent work on photovoltaic fundamentals and new concepts, categorized in four subareas as presented below. We encourage people to submit papers **on detailed scientific research studies** and **visionary papers** addressing the full range of fundamental materials and technological challenges for the future of our field, including:

Subarea 1.1: Fundamental Conversion Mechanisms

Recently, a variety of new paradigms for photovoltaic conversion have been proposed. Subarea 1.1 attempts to capture the best experimental and theoretical work exploring these new approaches. Examples of new mechanisms of interest are non-conventional PV conversion processes based on quantum confinement and nanostructured concepts, intermediate-band solar cells, multiple charge generation, up/down converters, thermophotonics, hot-carrier cells, and other concepts. Also, new device structures that incorporate such features as quantum dots, wires, and wells, highly metamorphic materials, and new materials systems are also of interest. Finally, cross-cutting science approaches which may involve heretofore unexplored materials, such as new hybrid organic/inorganic molecules, or innovative device structures, such as luminescent concentrator designs, are solicited.

Subarea 1.2: Quantum Dots, Nanowires, and Quantum Wells

The use of quantum confined materials has great potential for exploitation in future photovoltaic conversion systems. Subarea 1.2 will cover the synthesis, characterization, and modeling of these low-dimensional materials and devices. This will include developmental studies on both colloidal and epitaxial new quantum dot





systems and their use in devices. Papers on the theoretical and experimental progress in the development of intermediate band solar cells are anticipated. New results are solicited on the growth and use of nanowires and nanotubes for a variety of photovoltaic applications, such as light-trapping antireflection coatings and as absorber materials. Finally, the use multiple quantum wells and other means of bandgap engineering for new multi-layer and concentrator solar cells are included in this subarea.

Subarea 1.3: Nanostructures for Hybrid Solar Cells

The combination of a variety of new inorganic and organic, crystalline and amorphous, nanomaterials has provided tremendous improvements to a number of photovoltaic systems. Subarea 1.3 attempts to capture the latest developmental trends along this line. Papers are sought examining the use of nanostructures for exciton disassociation, electron and hole transfer, and photon up- and down-conversion and absorption. Examples include silicon nanowires and other inorganic nanostructures used in concert with a variety of doped and undoped polymer coatings.

Subarea 1.4: Novel Materials Systems

Subarea 1.4 covers progress on the development of new materials for photovoltaic applications. This includes the theoretical and experimental development of new compound semiconductors based on more abundant or less toxic elements that may be used as replacements for current state-of-the-art materials. Materials with improved physical properties, such as absorption coefficients, carrier mobilities, or bandgaps are also included. Also, advances in coatings such as oxygen and moisture barriers or transparent conductors are of interest. New and better antireflection coatings and materials used in selective filters are solicited. Finally, just as tremendous progress has been in the metamorphic growth of epitaxial III-V materials on single crystal substrates, papers which focus on the metamorphic growth of III-Vs on alternative substrates, or the metamorphic growth of II-VI or SiGe materials will be covered in this subarea.

Please check our website for the 35th IEEE PVSC at www.ieee-pvsc.org . Extended abstracts of 3 pages in length need to be submitted before the deadline on February 15, 2010, on the conference website.

Looking forward to see you all during an exciting and thought-provoking meeting in Honolulu, Hawaii.

Sincerely yours,

Ryne Raffaele, *National Renewable Energy Laboratory (NREL), USA*
Area 1 Chair

N. (Ned) Ekins-Daukes, *Imperial College, London, United Kingdom*
Yoshitaka Okada, *The University of Tokyo, Japan*
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