R-8142

Lead Inventors: Charles Fortmann, Ph.D., Department of Materials Science and Engineering

Title: Gradient Solar cells

Background: Solar photovoltaic electrical power accounts for less than 1% of the global electric power generation. In order to capture a greater share of the electric market, the cost will have to be substantially reduced and the conversion efficiencies increased. Silicon-based photovoltaic power generation is a maturing field with little prospect for either cost reduction or conversion efficiency increase. Organic and/or dye-based solar cells are relatively new with greater prospect for optimization in performance and substantial probability for reduced cost; however, the solar conversion efficiency of these is too small to justify commercialization. The poor performance of these new types of solar cells is a direct result of poor charge transport.

Technology Description: The technology developed by Dr. Fortmann improves the performance of low cost solar cells through an extensive understanding of the science of charge flow and materials engineering. The improvement in the solar panel’s performance is achieved through the careful consideration and grading of a specific material property, the dielectric constant, which enables the transport of photo-generated carriers to be augmented in a way that increases the solar cell efficiency.

Applications: Solar Energy

Advantages: Improves performance of low cost solar cells

Patent Number / Publications: Patent Pending

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