NanoHorizons Patents Cost and Efficiency Breakthrough for Solar Cells and Organic LEDs

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NanoHorizons, Inc. announced yesterday that it has received a notice of allowance from the US Patent Office for its innovative nanoscale photovoltaic cell design. NanoHorizons' design enables dramatic improvements in solar cell efficiency and breakthrough reductions in fabrication costs. Brighter, more efficient Organic LEDs (OLEDs) are also made possible. The new technology will be available via NanoHorizons' new Technology Licensing Program.

Breaking the Barrier to Cheap AND Efficient Solar Energy: "Layered Design" is the problem
Solar-generated electrical power using today's best photovoltaics costs 4-10 times more than conventional power generation because today's solar cells are far too expensive to deploy widely and are only about 15% efficient.

In conventional photovoltaic cell designs, photons enter an absorption layer producing energized electrons. These electrons travel across a portion of the absorption layer to a collection layer where electrical energy is captured. Both the absorption of photons producing energized electrons and the collection of that energy occur along one line of travel, perpendicular to the layers of the cell.

"Layered designs face an inherent paradox," explains co-inventor Dr. Ali Kaan Kalkan, "Thicker light-absorbing layers are needed to capture

sufficient light energy, but their thickness makes it difficult for electrons to reach collection layers. Thinner layers reduce loss, but thin layers absorb too little light. What's been needed is a new approach that allows the light absorption path to be optimally long, while simultaneously moving efficient collection much closer to the source of energized electrons."

NanoHorizons' innovation: A 90-degree turn and applied nanotechnology

NanoHorizons' design utilizes a single nanoscale-engineered structure to perform both absorption and collection: An array of efficient vertically-aligned collector "nano-spikes" (made of nanofibers, nanowires, nanotubes, or nanoparticle chains) rise throughout a layer of light-absorptive material. By integrating vertical nano-spike collectors into the absorption material itself, energy collection now occurs at 90 degrees to the absorption process.

This breakthrough enables photovoltaics builders to use an optimally thick absorption layer while dramatically shortening collection distance by as much as 1000-fold (tens of nanometers vs. tens of microns in today's best two-layer cells) - eliminating the impact of absorption layer thickness on collection distance.

Brighter future for photovoltaics and organic LEDs

"Solar energy development has been held up by barriers inherent in cell design. These barriers have now been broken," said Stephen Fonash, PhD., founder of NanoHorizons and co-inventor of the newly patented technology. "Our nanoscale approach can enable collection lengths as small as a few tens of nanometers, opening the door to the use of inexpensive materials and fabrication processes, while simultaneously

enabling a truly optimized absorption length. This technology is poised to greatly stimulate growth in the solar energy and Organic LED sectors."

New photovoltaic devices utilizing NanoHorizons' technology can be manufactured with lower-quality materials on high-throughput production lines that use rollers and coating/spraying machines.

NanoHorizons, Inc.