Third-Party Validation of Brilliant Light Power (BrLP) SunCell Technology

During April-May 2016, five independent third-party validations of Brilliant Light Power's SunCell Technology were carried out at BrLP's facilities in Cranbury, NJ. In each case, a scientist from academia or industry supervised and directed experiments and measurements, with BrLP staff acting in a support role to facilitate the work of the validator. Experimental set-ups were built from components, and instruments were calibrated in accordance with manufacturer's specifications under the supervision of the validators. Similar off-site validations are planned in the coming months, but will take more time to organize due to the required specialized equipment.

Approach. All five validations replicated previous experiments, measurements and results of BrLP scientists. The experimental basis for the SunCell technology was evaluated with four different approaches: (1) thermal power measurement of an operating SunCell; (2) calorimetry of low-voltage ignition of single shots of hydrated silver that forms the basis of the SunCell technology; and (3, 4) determination of the power of light from low-voltage ignition of hydrated silver shots with McPherson grazing and normal incidence spectrometers, and a Mightex spectrometer system to identify power in the relevant parts of the spectrum and splicing the regions to get the total optical power. Both sets of spectroscopic experiments were calibrated against traceable National Institute of Science and Technology (NIST) light sources with known power, energy and spectral characteristics.

Results. All five validations[1] confirmed previous experiments, measurements and results[2] of BrLP scientists as well as the theoretical basis[3] for the SunCell technology. Single shots of just 10 micro-liters of hydrated silver (~2x2x2 mm) produce about 500 kW of power, almost exclusively in the extreme ultraviolet (EUV, 10-100 nm, 100 kW) and ultraviolet range (100-380 nm, 400 kW). Since the silver-and-water-vapor atmosphere in the SunCell is opaque to ultraviolet light, short-wave "black" light is transformed into visible light, approximating sunlight (5800 K). The enormous power of the reaction typically melts the 4 mm wall of the stainless steel container within one minute.

Commercial implications. The commercial potential for SunCell technology is enormous. In parallel with the experimental work of the past two years, BrLP has designed, built and refined a number of commercial prototypes that are now nearing commercialization. The SunCell prototype consists of a tungsten reaction chamber that contains the silver and oxide catalysts, inductively coupled heater and tungsten electrodes. The reaction chamber serves as a blackbody radiator, emitting light at about 3000 K, similar to a halogen lamp. The reaction chamber is surrounded by a water-cooled spherical receiver that uses multi-junction photovoltaic cells to convert "halogen" light into electricity. All SunCell components are based on well-known technologies from electrical lighting, photovoltaic, semiconductor, refractory and aerospace industries, and use widely available materials. What is new is the design and technology of the SunCell, based on BrLP's theoretical and experimental breakthroughs, protected by a patent portfolio and proprietary know-how.

Cost of SunCells are estimated to be in the range of $60/kW in mass production–far cheaper than any other known electric power generation technology. SunCells will virtually eliminate scale economies in power generation since the cost (per kW) of a 10 kW residential unit will be almost the same as a 500 kW unit for heavy trucks and construction equipment. Larger facilities will simply consist of multiple 250 or 500 kW units. The most attractive initial uses for SunCells will be stationary residential and commercial electric power generators (10-500 kW), followed by mobile applications with high capacity utilization (trucks, buses, ships, 250-500 kW), and eventually cars and light trucks (100-250 kW). BrLP will lease SunCells to end-users who will pay a per-kWh or monthly rental fee, typically 50% of present electricity/energy costs.[4]

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[1] Validation reports are available to investors and commercial partners, please contact lkline@brilliantlightpower.com
[2] http://brilliantlightpower.com/wp-content/uploads/papers/SunCellPaper.pdf
[3] http://brilliantlightpower.com/book-download-and-streaming/
[4] http://brilliantlightpower.com/wp-content/uploads/presentations/BrLP-Business-Presentation-042816.pdf