Contactless solar-cell microcrack inspection

The 'GP MICRO-D .Cell' is a fully automated contactless measuring system developed by GP Solar that inspects cells for material defects and then rejects any that are faulty. This is the company's latest addition to its silicon solar-cell inspection product line.

One of the attractions of contactless inspection is that it does not subject the cells to any mechanical stress. The system can be implemented either as a quality control unit in a solar-cell production line or as a receiving inspector in module production.

The measurement principle is based on monitoring non-homogeneous reflections that occur within microcracks. The system's analytical software corrects for the presence of metal contacts on the front side of the cells. The measurement is not influenced by either the aluminium-coated cell back or the grain boundaries of the crystal structure in polycrystalline cells. High recording and analytical speeds enable throughputs of one cell per second or more.

www.gpsolar.de

Portable spectrometer assesses solar simulators

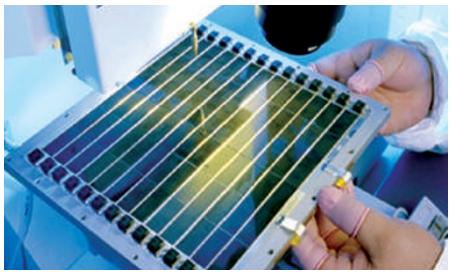
StellarNet, a manufacturer of low-cost miniature spectrometers, has developed a new solar monitoring system that evaluates solar simulators in accordance with the standards drawn up by organizations such as IEC (the International Electronics Commission), JIS (Japanese Industrial Standards) and ASTM (formerly the American Society for Testing and Materials). The complete system consists of a portable ultraviolet/visible/near-infrared grating-based spectrometer, a fibre-optic cable and a light receptor. SpectraWiz spectroscopy software, included with the system, now features a solar match application panel that can be used to characterize and classify solar simulators.

High-performance solar simulation is becoming a necessity as photovoltaic cell manufacturers continue to demand higher production volumes and increased cell uniformity. Many companies offer high-performance solar simulator lamps, which provide the cell manufacturer with a means of measurement uniformity, comparability and traceability. Similarly, organizations such as IEC, JIS and ASTM have developed standards that define solar simulator performance in three key performance areas: spectral match to the solar spectrum, spatial uniformity of irradiance and temporal stability.

The system calculates spectral irradiance for each 100 nm bin over the 400–1,100 nm range, and then compares the results to the ideal percentage for each range according to IEC, JIS and ASTM standards. The proximity of the measured data to the ideal values then allows the solar simulator lamp under testing to be classified accordingly.

www.stellarnet.us

Plant-based backsheet offers green answer



BIOSOLAR

US company Biosolar has developed a backsheet for crystalline silicon photovoltaic modules that is made from renewable plant materials. The 'BioBacksheet' is designed to replace the expensive and environmentally hazardous petroleum-based backsheets that are currently in use.

The primary material for the commercial-grade BioBacksheet is a durable polyamide resin made from castor beans, which is then combined with a secondary non-petroleum material to form a highly durable photovoltaic backsheet film. In addition to being 'green', the BioBacksheet has several additional advantages over other commercial backsheet films. For example, its single-layer nature means that it does not suffer from interlayer de-lamination — a common problem in conventional laminated backsheets — making it more reliable than the backsheets available on the market today, according to Biosolar. The material also offers the durability and environmental characteristics of conventional petroleum-based plastics, including good electromagnetic properties, high mechanical strength, dimensional stability and weatherability — all of which are required by photovoltaic solar applications.

BioBacksheet will be available in rolls of film for direct use in lamination and roll-to-roll assembly systems. Bio-based materials can be produced inexpensively, and because they are derived from renewable plant sources their costs are not tied to the price of oil. In the past, conventional bio-based materials have not been successfully used in photovoltaic applications owing to their low melting temperature and fragile molecular structure. Most other bio-based materials available today cannot withstand solar-cell manufacturing processes.

www.biosolar.com

X-ray fluorescence measures composition and thickness in-line

Solar Metrology, a developer of X-ray fluorescence (XRF) analysis tools, has expanded its portfolio for assessing the composition and thickness of CIGS (copper indium gallium selenide) photovoltaic layers.

The SMX-ILH is an atmospheric in-line XRF metrology tool platform that characterizes thin-film solar photovoltaic film stacks on flexible roll-to-roll substrates such as stainless steel, aluminium and polyimide, or rigid substrates such as float glass.

The unit is designed to perform measurements in an atmospheric environment, either near-line or in-line. Solar Metrology claims that it is simple to integrate the SMX-ILH into an existing process. The ILH platform includes both fully integrated, stand-alone tools and remote configurations that can be incorporated directly into a tool or production line, thus providing the versatility and adaptability needed to match requirements at each XRF measurement point in a process.

www.solarmetrology.com

In-line diffusion system handles high throughput

BTU's integrated Meridian In-Line Diffusion System for processing solar-cell wafers combines a quartz-lined diffusion furnace with a dual-sided phosphorous coater and wafer dryer. The system can be configured to process up to 1,500 wafers per hour. An excellent thermal uniformity of ±2 °C produces predictable and repeatable sheet resistance values. This range covers not only the requirements of today's cell designs, but also the shallow emitters needed for next-generation solar-cell designs, including selective emitter cells. The quartz lining ensures the tight atmospheric control required to maintain proper phosphorus drive-in. The phosphorus coater features a highly reliable nozzleless spray technology.

The in-line approach offers a far greater throughput than the batch process, as well as superior uniformity, lower wafer breakage and shorter processing times. Detailed cost-of-ownership models have shown that the per-wafer costs of in-line diffusion may be only a third of those of a batch diffusion furnace.

www.btu.com