Efficiency Measurement of Organic Solar Cells

Equipment: Class AAA Solar Simulator (M/s Photo Emission Technology, USA and Calibrated in APEX Level Facility at CSIR-NPL)

Property Measured: Open circuit voltage, short circuit current, Fill Factor and Efficiency of solar cell

Basic Principle: Solar simulator provides illumination approximating natural sunlight. The use of solar simulator is to provide a controllable indoor test facility under laboratory conditions for the testing of solar cells.

Capabilities: All the parameters used in measurement of efficiency of solar cell have been calibrated at apex facility of CSIR-NPL. Thus, the solar simulator being used can provide measurement of the solar cell parameters with greatest accuracy.

In India, the research on solar cells is being pursued in the scientific laboratories and industries; however, there is no center for the validation of solar cell efficiency. Globally there are three recognized centers available for validation of solar cell efficiency namely NREL (USA), PTB (Germany) and AIST (Japan). In order to validate the efficiency of the fabricated solar cells, these have to be sent to one of the mentioned centers and this process is not only expensive but also time consuming. For the validation of efficiency of such devices it requires calibration of various individual parameters involved in measurement of efficiency such as light source, current/voltage meter, temperature sensors and active area of device. Being 'National Metrology Institute' (NMI) of India, CSIR-National Physical Laboratory (NPL) has standards and traceability to all units used in solar cell efficiency measurement. The 'facility for validation of solar cell efficiency with the maximum possible accuracy available at CSIR-NPL is a potential service to the nation, including the academic institutions & research laboratories and industries across the country.

Sample Requirement: Min. 20 mm x 20 mm and Max. 10 cm x 10 cm with contact pads as specified in geometry of contact pads given in the link.

Time per Sample: One and half hour for the first sample and for the rest 30 min each.

Cost per Sample: As per CSIR guidelines and based on type of solar cell.