Sandia's Solar Programs and Other Sandia Capabilities & Facilities

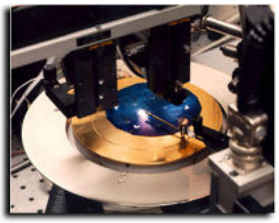
Sandia National Laboratories

Help our nation secure a peaceful and free world through technology.

Sandia National Laboratories' facilities and personnel will support the goals of the Solar America Initiative (SAI) through: cooperation with Technology Pathway Partnerships and Market Formation Partnerships for R&D on commercial and manufacturing prototype technology; non-Technology Pathway Partnership-specific laboratory-scale prototype technology; long-term, potentially revolutionary R&D; and, access by the Partnerships to key laboratory facilities

Cell Measurement and Analysis

Sandia's world class cell measurement laboratory performs NIST-traceable measurement of one-sun and multi-sun Illuminated current vs. voltage (IV), dark-IV evaluations, absolute spectral response, hemispherical spectral reflectance, and more. When combined with numerical simulation software, Sandia researchers are able to glean important information about the performance-limiting mechanisms of both laboratory and commercial Si solar cells.



Module and Systems Analysis

The PV System Optimization Lab (PVSOL) is a fully instrumented facility for evaluating all factors influencing system energy production, long-term reliability, and safety. Capabilities are applied both in-house and for system field testing and supports component manufactures and system integrators. Data returned provides validation of system performance models.

Two 3-kW arrays with variable orientation options used for system optimization, inverter characterization and validation of performance models.

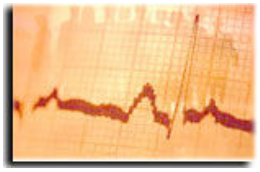
Balance –of-Systems and Distributed Energy Technologies

Lab capabilities include evaluating pre-production models (prototype, alpha, or beta) for code performance, performance and compliance with utility interconnection standards. Sandia also performs evaluations on power electronic inverters, packaged PV systems, intelligent system controllers, battery charge controllers, and hybrid systems.

Fully instrumented, easily configured, inverter and systems characterization.

Reliability & Life Cycle Costs Analysis in the SAI Market Formation

Sandia has developed a capability to assess the performance, cost and reliability of fielded PV systems. It was developed to provide a historical perspective on system performance based on actual field operation. An MS Access database has been created as a tool to collect system, component and O&M information as well as to support data analysis. These analysis are based on information captured and made available, including performance, initial costs and maintenance records, by partners who have system installed in the field.



…..Other Sandia Capabilities & Facilities

Microsystems and Engineering Science Applications (MESA)

State-of-the art facility designed to accelerate the science and application of microsystem technologies. These small, highly integrated and low-power mechanisms are created using integrated circuit fabrication technology that allows for the combination of diverse functions on a single computer chip.

Sandia technician is shown with one of the metal deposition systems in the Microelectronics Development Laboratory, an existing facility that will be a part of the proposed MESA Complex.

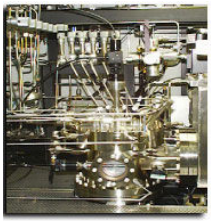
Microelectronic Development Laboratory (MDL)

Failure analysis, reliability, test, modeling and simulation, advanced packaging, radiation harness assurance, device design, and silicon device fabrication.

Microelectronics Development Laboratory (MDL)

Compound Semiconductor Research Lab (CSRL)

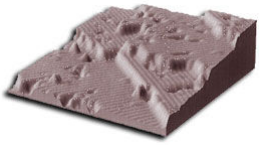
Nine epitaxial growth systems, E-beam lithography, on beam etching, high density plasma reactive ion etching.



Organometallic Vapor Phase Epitaxy (OMVPE) Reactor

Integrated Materials Research Laboratory (IMRL)

Investigates advanced metallic alloys, semiconductors, corrosion, and optical and dielectric materials.



Scanning tunneling microscope (STM) image of the Si (001) crystal surface magnified approximately 10 million times. Single-atom-height steps and rows of surface atoms are observed.

Processing and Environment Technology Laboratory (PETL)

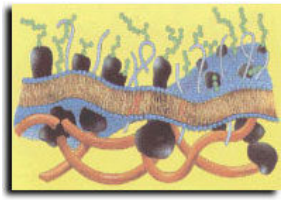
Advanced processes for efficient and environmentally conscious manufacturing, nanoscale diagnostics, materials self-assembly, materials aging and reliability, materials and process modeling, and development of advanced methodologies for information detection, extraction, and analysis.

Advanced Manufacturing Processes Laboratory (AMPLE)

Encapsulation: foams, elastomers, and rigid resins (epoxies, silicones and polyurethanes), research into the stresses during curing, the mechanisms of interface debonding, and flow parameters of polymers. Also thin film deposition: extensive experience with coating processes, including sputter deposition, electronic beam evaporation and electroplating.

Center for Integrated Nanotechnologies (CINT)

A national user facility for establishing the scientific principles that govern the design, performance, and integration of nanoscale materials, provides open access to tools and expertise to explore the continuum from scientific discovery to the integration of nanostructures into the micro and macro world.



Nano Bio Interfaces

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