



Development of Commercial Technology for Thin Film Silicon Solar Cells on Glass

**Cooperative Research and
Development Final Report**

CRADA Number: CRD-07-209

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Efficiency & Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.**

CRADA Report
NREL/TP-7A10-57655
March 2013

Contract No. DE-AC36-08GO28308

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In accordance with Requirements set forth in Article XI.A(3) of the CRADA document, this document is the final CRADA report, including a list of Subject Inventions, to be forwarded to the Office of Science and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

CRADA Number: CRD-07-209

CRADA Title: Development of Commercial Technology for Thin Film Silicon Solar Cells on Glass

Parties to the Agreement: Applied Optical Sciences Corporation

Joint Work Statement Funding Table showing DOE commitment:

Estimated Costs	NREL Shared Resources
Year 1	\$ 50,000.00
Year 2	\$ 870,000.00
Year 3	\$ 245,000.00
TOTALS	\$ 1,165,000.00

Abstract of CRADA work:

NREL has conducted basic research relating to high efficiency, low cost, thin film silicon solar cell design and the method of making solar cells. Two patents have been issued to NREL in the above field. In addition, specific process and metrology tools have been developed by NREL. Applied Optical Sciences Corp. (AOS) has expertise in the manufacture of solar cells and has developed its own unique concentrator technology. AOS wants to complement its solar cell expertise and its concentrator technology by manufacturing flat panel thin film silicon solar cell panels. AOS wants to take NREL's research to the next level, using it to develop commercially viable flat pane, thin film silicon solar cell panels. Such a development in equipment, process, and metrology will likely produce the lowest cost solar cell technology for both commercial and residential use. NREL's fundamental research capability and AOS's technology and industrial background are complementary to achieve this product development.

Summary of Research Results:

We developed a new optical furnace (Optical Cavity Furnace) that uses reflecting surfaces and no cooling for fabricating solar cells and microelectronic devices. This furnace is very highly energy efficient. This furnace was used to crystallize amorphous silicon. One of the new applications is to rapidly grow a thin junction on crystalline silicon wafers by depositing a thin layer of amorphous silicon and crystallizing it by an epitaxial growth.

Subject Inventions Listing:

U.S. Application No. 13/793,626, filed March 11, 2103, entitled "Semiconductor Device PN Junction Fabrication

Report Date: 1/23/2013

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