NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Metallic Inks for Solar Cells

Cooperative Research and Development Final Report

CRADA Number: CRD-10-370

NREL Technical Contact: Maikel van Hest

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Cooperative Research and Development Final Report

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-10-370

CRADA Title: Metallic Inks for Solar Cells

Parties to the Agreement: Applied Nanotech, Inc.

Joint Work Statement Funding Table showing DOE commitment:

Estimated Costs	NREL Shared Resources
Year 1	$ 00.00
Year 2	$ 00.00
Year 3	$ 00.00
TOTALS	$ 00.00

Abstract of CRADA work:

This document describes the statement of work for National Renewable Energy Laboratory (NREL) as a subcontractor for Applied Nanotech, Inc. (ANI) for the Phase II SBIR contract with the Department of Energy to build silicon solar cells using non-contact printed, nanoparticle-based metallic inks. The conductive inks are based upon ANI's proprietary method for nanoparticle dispersion. The primary inks under development are aluminum for silicon solar cell back plane contacts and copper for top interdigitated contacts.

The current direction of silicon solar cell technology is to use thinner silicon wafers. The reduction in wafer thickness reduces overall material usage and can increase efficiency. These thin silicon wafers are often very brittle and normal methods used for conductive feed line application, such as screen-printing, are detrimental. The Phase II program will be focused on materials development for metallic inks that can be applied to a silicon solar cell using non-contact methods. Uniform BSF (Back Surface Field) formation will be obtained by optimizing ink formulation and curing conditions to improve cell efficiency.

Summary of Research Results:

The research has resulted in the optimization of ink for Aluminum back contacts. These inks have been tested using various contact configuration patterns. Tests were performed on various silicon solar cell materials. The metallization deposited using inks showed cell efficiencies similar to cells with screen printed contacts.

Subject Inventions Listing: N/A

Report Date: 2/15/13 **Responsible Technical Contact at Alliance/NREL**: Maikel van Hest

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