NATIONAL RENEWABLE ENERGY LABORATORY

New N-Type Polymers for Organic Photovoltaics

Cooperative Research and Development Final Report

CRADA Number: CRD-06-177

NREL Technical Contact: Dana Olson

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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.

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CRADA Title: New N-Type Polymers for Organic Photovoltaics

Parties to the Agreement: TDA Research, Inc.

Joint Work Statement Funding Table Showing DOE Commitment:

Estimated Costs	**NREL Shared Resources**
Year 1	$ 10,000.00
Year 2	$ 50,000.00
TOTALS	$ 60,000.00

Abstract of CRADA Work:

This CRADA will develop improved thin film organic solar cells using a new n-type semiconducting polymer.

High efficiency photovoltaics (PVs) based on inorganic semiconductors have good efficiencies (up to 30%) but are extremely expensive to manufacture. Organic PV technology has the potential to overcome this problem through the use of high-throughput production methods like reel-to-reel printing on flexible substrates. Unfortunately, today's best organic PVs have only a few percent efficiency, a number that is insufficient for virtually all commercial applications. The limited choice of stable n-type (acceptor) organic semiconductor materials is one of the key factors that prevent the further improvement of organic PVs. TDA Research, Inc. (TDA) previously developed a new class of electron-deficient (n-type) conjugated polymers for use in organic light emitting diodes. During this project, TDA, in collaboration with the National Renewable Energy Laboratory, will incorporate these electron-deficient polymers into organic photovoltaics and investigate their performance.

TDA is developing new materials and polymers to improve the performance of organic solar cells. Materials being developed at TDA include spin coated transparent conductors, charge injection layers, fullerene derivatives, electron-deficient polymers, and three-phase (fullerene/polythiophene/dye) active layer inks.

Summary of Research Results:

New conjugated polymer contact layers and transparent electrodes and electron acceptor materials were evaluated in organic photovoltaic devices.

Subject Inventions Listing:

None

Report Date:

July 14, 2014

Responsible Technical Contact at Alliance/NREL:

Dana Olson

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