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NATIONAL RENEWABLE ENERGY LABORATORY

Investigations into Performance and Lifetime Enhancements of OPV Devices

Cooperative Research and Development Final Report

CRADA Number: CRD-08-263

NREL Technical Contact: David Ginley

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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-08-263

CRADA Title: Investigations into Performance and Lifetime Enhancements of OPV Devices

Parties to the Agreement: Plextronics, Inc.

Joint Work Statement Funding Table Showing DOE Commitment:

Estimated Costs	NREL Shared Resources
Year 1	$ 100,000.00
Year 2	$ 150,000.00
TOTALS	$ 250,000.00

Abstract of CRADA Work:

As a part of this joint work, Plextronics and NREL will investigate several issues to accelerate the performance of organic photovoltaic (OPV) devices, especially as it pertains to lifetime and stability. Study of degradation mechanisms of OPV devices will allow researchers to tune materials, formulations, and device fabrication methods to improve overall performance. Simultaneous work on Transparent Conducting Oxides (TCOs) and other materials will be carried out along with joint investigation of the application of Plexcore materials in OPV devices and modules.

As a part of this joint work, Plextronics and NREL will investigate several issues to accelerate the performance and commercial viability of OPV materials and devices. These studies will include computational analysis and potential synthesis of various target materials from Plextronics intellectual property portfolio, lifetime and stability of OPV devices, studies TCOs—which are alternatives to indium tin oxide (ITO)— and investigations of interface phenomena leading to degradation in OPV devices.

To evaluate Plextronics additive in battery applications, Plextronics will provide to NREL a starting point, including materials and cursory data for proof of concept. The initial phase will include fabrication and testing with LiCoO2 based coin cells with and without Plextronics' additive.

To evaluate Plextronics new additives and derivatives in lithium-ion battery applications, Plextronics will provide to NREL a starting point, including materials and initial data for proof of concept. The central focus of this project is to ascertain the nature of the efficacy of the Plextronics additives through physical and electrical characterization, including evaluations of new derivatives, system evaluations on batteries made with Plexcore, and to study long-term cycling performance differences. The initial focus is to establish Plexcore mode of action to support the commercialization of the first commercial evaluations of Plexcore in September 2013.

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Summary of Research Results:

Half of the project focused on testing OPV devices and the other half of the project evaluated battery additives for lithium batteries. NREL's role was predominantly to characterize materials and their integration into devices.

Subject Inventions Listing: None

Report Date: February 28, 2014

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