Omnisole Product Testing

Cooperative Research and Development Final Report

CRADA Number: CRD-19-00833

NREL Technical Contact: William Marion

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
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Contract No. DE-AC36-08GO28308

Technical Report
NREL/TP-5K00-80499
July 2021

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NOTICE

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Cooperative Research and Development Final Report

Report Date: July 7, 2021

In accordance with requirements set forth in the terms of the CRADA agreement, this document is the CRADA final report, including a list of subject inventions, to be forwarded to the DOE Office of Scientific and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

Parties to the Agreement: Sustainable Products, LLC

CRADA Number: CRD-19-00833

CRADA Title: Omnisole Product Testing

Responsible Technical Contact at Alliance/National Renewable Energy Laboratory (NREL):

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Sponsoring DOE Program Office(s):

Office of Energy Efficiency and Renewable Energy (EERE), Solar Energy Technologies Office (SETO)

Joint Work Statement Funding Table showing DOE commitment:

Estimated Costs	NREL Shared Resources a/k/a Government In-Kind
Year 1	$35,486.00
Year 2, Modification #1	$.00
Year 3, Modification #2	$.00
Year 4, Modification #3	$.00
TOTALS	$35,486.00

Executive Summary of CRADA Work:

NREL will perform side-by-side thermal and electrical output testing of two 60-cell PV modules with and without the installation of the Omnisole base product. This will provide understanding of any performance advantages compared to commercially available PV modules and installations.

Summary of Research Results:

NREL Tasks:

Task 1: NREL shall construct an 8' x 8' artificial asphalt shingle roof surface on the existing test rack structure at NREL's Outdoor Test Facility using plywood sheathing, underlayment, and black or dark gray composite asphalt roofing shingles such as https://www.homedepot.com/p/GAF-Timberline-Natural-Shadow-Charcoal-Lifetime-Architectural-Shingles-33-3-sq-ft-per-Bundle-0601180/100658149. The slope of the artificial roof will be the same as the rack structure—40°—and functionally equivalent to a 10/12 pitch (39.8°).

The artificial roof surface was completed as described above. The completed artificial roof surface is shown in Fig. 1.

Fig. 1. Completed artificial roof surface ready for the installation of the Omnisole products.

Task 2: Install an Omnisole base with cool white metal ballast on the artificial roof. With thermocouples, measure the temperature of the Omnisole base, the roof under the base, and the sunlit roof outside the base over a range of irradiance conditions and prevailing wind conditions to illustrate the temperature of the base with respect to ambient dry bulb temperatures, roof temperature, and irradiance. Use an infrared camera to record digital images of the Omnisole base and roof over a range of irradiance conditions.

Task 2 was not completed. Products to be tested were not received from participant.

Task 3: Install a 60-cell bifacial PV module provided by Omnisole on the Omnisole base. Use thermocouples for measuring the backside temperature of the PV module, the Omnisole base, the roof under the base, and the sunlit roof outside the base.

Task 3 was not completed. Products to be tested were not received from participant.

Task 4: Install a 60-cell bifacial PV module provided by Omnisole using a conventional rack and rail system including a down slope wind deflector and debris guards on the other three sides. Use thermocouples for measuring the backside temperature of the PV module, the roof under the PV module, and the sunlit roof outside the PV module.

Task 4 was not completed. Products to be tested were not received from participant.

Task 5: For the two PV modules, measure the thermocouple temperatures and the PV module dc powers, voltages, and currents (time-series of 15-minute averages) for 1-2 weeks (depending on time constraints). Use an infrared camera to record digital images of the two PV modules and roof over a range of irradiance conditions.

Task 5 was not completed. Products to be tested were not received from participant.

Task 6: Prepare a memo report with photographs, graphs, and data tables documenting the installation and (1) comparing/contrasting the thermal and electrical performance of the two PV modules, with and without the use of the Omnisole base and (2) comparing/contrasting the temperatures of the Omnisole base without PV modules to the temperature of the sunlit dark roof shingles.

Task 6 was not completed. Products to be tested were not received from participant.

Task 7: Host a one-day site visit for Omnisole, to review the test installation and to meet with NREL scientists and engineers to receive any suggestions or advice they may have after reviewing the design of the Omnisole base. Review areas to include material selection, weatherability, thermal performance, electrical safety, and ease of installation and maintenance.

Task 7 was not completed. Products to be tested were not received from participant.

Participant tasks:

Task 1: Provide NREL two 60-cell monofacial PV modules for testing.

Task 1 was not completed. Products to be tested were not received from participant.

Task 2: Attend a site visit to review the test installation and to meet with NREL scientists and engineers to receive any suggestions or advice they may have after reviewing the design of the Omnisole base.

Task 2 was not completed. Products to be tested were not received from participant.

Subject Inventions Listing:

None

ROI #:

None