

PMC-ND

(1.08.09.13)

U.S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
NEPA DETERMINATION



RECIPIENT: Tao Xu/Northern Illinois University

STATE: IL

PROJECT TITLE On-device Lead Detention for Perovskite Solar Cells: The project will develop potential solutions for the effective capture of lead leakage upon severe device damage of perovskite photovoltaic modules without deteriorating device performance.

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0002064	DE-EE0008989	GFO-0008989-001	GO8989

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

CX, EA, EIS APPENDIX AND NUMBER:

Description:

A9 Information gathering, analysis, and dissemination Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

B3.6 Small-scale research and development, laboratory operations, and pilot projects Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Northern Illinois University (NIU) to develop on-device lead absorbing films for perovskite solar cells (PSCs). The project would seek to address lead leakages in PSCs and consequently, mitigate against the public health risks associated with lead contamination. Solar photovoltaic (PV) films would be developed with the ability to sequester leaked aqueous lead from damaged solar PV devices, without affecting performance efficiency.

Proposed project activities would include material characterization, development/fabrication of lead-absorbing films, film stability testing (i.e. device compatibility testing), performance testing (e.g. lead sequestration efficiency, PV performance), and outdoor testing.

All project activities would be performed at existing, purpose-built laboratory facilities that regularly perform work similar in nature to that included as part of the scope of this project. Film fabrication, lead-leakage testing, and outdoor testing would be performed at NIU's campus in DeKalb, IL. Device fabrication and PV performance testing would be performed at the National Renewable Energy Laboratory (NREL) in Golden, CO.

Outdoor testing would be performed at an existing building at NIU's campus (La Tourette Hall). Approximately six (6) solar PV devices would be tested on the rooftop of the building. Individually, each device would measure 2.5 cm x 2.5 cm. The six devices would be fitted within an aluminum box measuring 10cm x 10cm x 3cm. The box would then be secured to the roof for testing. The devices would integrate the lead-absorbing films previously developed. Following installation, the devices would be monitored over a three-month period, during which time, performance data would be collected and analyzed.

The location where testing would be performed is not near any properties listed by the National Register of Historic Places. There is no potential to adversely impact historic resources.

The Indiana Bat and Northern Long-Eared Bat (NLEB) are both listed species that have the potential to be in the area of the site where testing would be performed. The testing area would be outside of the designated critical habitat for the Indiana Bat. There is no designated habitat for the NLEB. Given the small footprint of the project (i.e. an aluminum box measuring 10cm x 10cm x 3cm) and considering that the box would be installed in a previously disturbed area in the built environment, DOE has determined that the project would have no effect on ESA-listed species or critical habitat.

Project work would involve the use and handling of industrial chemicals, chemical solvents, and lead-containing devices. All such handling would be performed in controlled laboratory environments. Risks associated with the performance of project activities would be mitigated through adherence to established health and safety policies and procedures. Protocols would include employee training, the use of personal protective equipment, engineering controls, monitoring, and internal assessments. Chemical solutions would be handled under fume hoods. Lead-containing devices would be handled in Argon-filled gloveboxes and stored in properly labeled containers. Both NIU and NREL also have established material handling and disposal practices that would be followed. Any hazardous waste materials produced would be disposed of by a qualified waste handler. NIU and NREL would observe all applicable Federal, state, and local health, safety, and environmental regulations.

Any work proposed to be conducted at a federal facility may be subject to additional NEPA review by the cognizant federal official and must meet the applicable health and safety requirements of the facility.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Solar Energy Technologies Office

This NEPA determination does not require a tailored NEPA Provision.

NEPA review completed by Jonathan Hartman, 12/23/2019

FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: _____

 Electronically Signed By: Kristin Kerwin

Date: 1/10/2020

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- Field Office Manager review not required
- Field Office Manager review required

BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: _____

Field Office Manager

Date: _____