

PMC-ND

(1.08.09.13)

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

**RECIPIENT:** The Ohio State University**STATE:** OH

PROJECT TITLE: Investigation of Ga₂O₃ as a new transparent conductive oxide for photovoltaics applications

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001840	DE-EE0008742	GFO-0008742-001	

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 Ohio State University (OSU) to investigate the potential of Ga₂O₃ as a transparent conductive oxide (TCO) for use in photovoltaics (PV) applications. UW would assess Ga₂O₃'s capacity for deposition, its optical and electronic properties, and its application to Si and Group III-V solar cells. All project work would be completed in a single Budget Period.

Proposed project activities would include analysis of deposition methods, thin film fabrication, material characterization, development of prototype Ga₂O₃ TCO layers for solar cell applications, fabrication of solar cells incorporating Ga₂O₃ TCO layers, and characterization/testing of solar PV cells.

All project activities would be completed by OSU at existing, purpose-built laboratory facilities at its campus in Columbus, OH. OSU's laboratory facilities regularly perform work similar in nature to that proposed as part of this project. Project work would not involve any modifications to existing facilities or ground disturbing activities, nor any changes to the use, mission or operation of existing facilities. Likewise, no additional permits or authorizations would be required.

Project activities would involve the use and handling of various hazardous materials including high pressure/toxic gases, industrial chemicals and solvents, flammable materials, and high-voltage industrial equipment. All such handling would occur in controlled laboratory environments. Potential risks would be mitigated through adherence to established university health and safety policies and procedures. Protocols would include personnel training, the use of personal protective equipment, engineering controls, and monitoring. At OSU's Semiconductor Epitaxy and Analysis Laboratory (SEAL), equipment containing an X-ray tube source, a laser, and a cryogenic liquid (liquid nitrogen) would be used for characterization activities. The equipment would be isolated in a laboratory space and would only be accessible to a trained user. Proper safety controls would also be used when handling this equipment, including the use of shielding to prevent X-ray exposure. All hazardous materials would be handled, stored, and disposed of in accordance with Federal, state and local health, safety, and environmental regulations.

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, 06/06/2019](#)

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: _____


NEPA Compliance Officer

Date: 6/7/2019

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: _____