

PMC-ND
(1.08.09.13)

U.S. DEPARTMENT OF ENERGY

OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY

NEPA DETERMINATION



RECIPIENT: University of Michigan

STATE: MI

PROJECT TITLE: Monolithically Integrated Thin-Film/Silicon Tandem Photoelectrodes for High Efficiency and Stable Photoelectrochemical Water Splitting

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001647	DE-EE0008086	GFO-0008086-002	GO8086

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 Regents of the University of Michigan (UM) to research materials for advanced photo-electrochemical water-splitting devices for use with high-quality hydrogen gas creation that would be used in fuel cell generators. Budget Period 1 (BP1) received a NEPA Determination on 07/18/2017. At that time, the subsequent two Budget Periods (BPs) were not reviewed, as the first Go/No-Go Decision Point had not been reached. A Go decision has now been reached and contract negotiation has taken place for both BP2 and BP3. Accordingly, this NEPA Determination will review both of these BPs.

Proposed project activities under BP2 would build on the research carried out previously under BP1. The design of previously developed semiconductor photoelectrodes would be optimized for efficiency, co-catalysts would be assessed for stability and performance, and spectroscopic/ kinetic studies would be performed to identify system/material limitations in the photoelectrodes. Under BP3, photoelectrodes would be further optimized for performance, device design alternatives would be assessed, and post-deposition annealing would be performed. Additionally, during BP3, long-term stability and performance testing would be completed.

Work would primarily take place at the University of Michigan in Ann Arbor, Michigan. Project partners' locations include: Michigan State University (East Lansing, MI), Boston College (Chestnut Hill, MA), and Toledo University (Toledo, OH). Design, synthesis, fabrication and testing of semiconductor photoelectrodes would be performed at the laboratory facilities of each entity, with the exception of University of Toledo. University of Toledo would solely provide assistance with computer modeling and analysis. No laboratory work would be performed at this institution.

All project activities would take place in existing laboratory facilities with no major modifications occurring. The project would involve the use and handling of various hazardous materials, including semiconductors, acids, solvents, and gases. All such handling would occur in-lab and follow proper hazardous material handling and disposal practices. Gaseous emissions produced would be vented through chemical fume hoods. Hazardous waste materials would be properly stored and labeled in accordance with each institution's Environmental, Health, and

Safety protocols, and would be disposed of by a certified hazardous waste transporter. All hazardous materials would be managed and disposed of in accordance with federal, state, and local environmental regulations. Existing University health and safety policies and procedures would be followed including employee training, proper protective equipment, engineering controls, monitoring, and internal assessments. No modifications to buildings or new permits, additional licenses and/or authorizations are expected to be required as a result of the proposed project.

NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Fuel Cell Technologies Office

This NEPA determination does not require a tailored NEPA provision.

Review completed by Jonathan Hartman on 01/29/2019

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:



Casey Strickland

NEPA Compliance Officer

Date:

1/30/2019

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: