PMC-ND
(1.08.09.13)

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

RECIPIENT: University of Hawaii **STATE:** HI

PROJECT TITLE: Novel Chalcopyrites for Advanced Photoelectrochemical Water-Splitting

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0001647	DE-EE0008085	GFO-0008085-002	GO8085

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.
B3.15 Small-scale indoor research and development projects using nanoscale materials	Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification activities would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to the University of Hawaii for the development and study of new chalcopyrite photocathodes for photo-electrochemical (PEC) water splitting (hydrogen production). Project work would occur within existing laboratory facilities at the University of Hawaii (Hawaii), University of Nevada, Las Vegas (UNLV), Stanford University (Stanford), Lawrence Livermore National Laboratory (LLNL), and the National Renewable Energy Lab (NREL). This is a three-year research project that includes three budget periods. Budget Period 1 (BP1) received a NEPA determination on 6/22/2017. At that time, only BP1 was being negotiated, so Budget Period 2 (BP2) and Budget Period 3 (BP3) were excluded from the review. These two budget periods are now being negotiated. Accordingly, this NEPA review will address BP2 and BP3 activities.

Project work would build on the tasks completed under BP1. Proposed project activities for BP2 would include computer modeling, thin film synthesis, characterization of chalcopyrite electronic properties, incorporation of dopants into chalcopyrite, property modeling for PEC water-splitting, and performance evaluations of chalcopyrite-based photo-electrode (HPE) devices. BP3 activities would include material synthesis and characterization, model validation, photocathode bonding onto chalcopyrites, and coating/surface optimization of photocathodes.

All proposed project activities would be completed at existing, purpose-built laboratory facilities. Project work at

LLNL would include theoretical modeling activities only while project activities at the other facilities would utilize standard laboratory equipment and would occur in existing laboratories designed for this type of work. No changes in the use, mission, or operation of existing facilities would be required, nor would any additional permits or authorizations need to be obtained.

The project would involve the use and handling of various gases, industrial solvents, and acidic electrolytes. All such handling would take place indoors, in laboratory setting. Risks associated with handling project materials/equipment would be mitigated through adherence to established health and safety policies and procedures. Hazardous materials would be handled under fume hoods when applicable and would be sealed, stored, and disposed of appropriately, following the established procedures of each individual facility. Project reporting to DOE would also include a Hydrogen Safety Plan. All work activities would comply with relevant Federal, state, and local health, safety and environmental regulations.

Nanoscale materials would be used and handled as part of the project. These materials would be deposited directly onto substrates in an enclosed vacuum chamber or in a glove box. All nanoscale materials used during the project would be thermodynamically stable, non-volatile, and bound to substrates. These substrates would be stored in the laboratory in enclosed containers for further tests and never disposed. DOE does not anticipate any impacts to resources of concern due to the proposed activities of the project.

NEPA PROVISION

DOE has made a final NEPA determination.

Include the following condition in the financial assisstance agreement:

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.

Notes:

Fuel Cell Technologies Office
This NEPA determination requires a tailored NEPA Provision.
NEPA review completed by Jonathan Hartman, 01/18/2019

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: Casey Strickland Date: 1/18/2019

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

- [x] 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: _____ Date: _____

Field Office Manager