PMC-ND
(1.08.09.13)

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

RECIPIENT: California Institute of Technology (CalTech) **STATE:** CA

PROJECT TITLE: Design and Synthesis of Materials with High Capacities for Hydrogen Physisorption

Funding Opportunity Announcement Number	Procurement Instrument Number	NEPA Control Number	CID Number
DE-FOA-0000827	DE-EE0007048	GFO-0007048-001	

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

CX, EA, EIS APPENDIX AND NUMBER:

Description:

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).
B1.31 Installation or relocation of machinery and equipment	Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide federal funding to California Institute of Technology (CalTech) to develop a carbon-based, functionalized material with a capacity for hydrogen storage by physisorption of 11 weight percent, a near-constant isosteric heat of adsorption, excellent kinetics, and long cycle life.

The proposed project activities would consist of procurement, preparation and functionalization of carbon materials (activated carbon and/or exfoliated graphites), synthesis of magnesium aluminate hydrotalcite, measurement of isotherms, and optimization of chosen material (either graphene or hydrotalcite). All activities associated with the proposed project would take place at CalTech's Keck and Steele Laboratories in Pasadena, CA. The facilities where the proposed project would occur have been previously used for work that is similar to the activities included in the proposed project; therefore, no new or modified permits would be required. The only physical modification to this facility would involve the installation of a cryogenics system known as a Sumitomo Displex Refrigerator. This installation would require an electrician to set up power, a plumber to supply cooling water and some minor carpentry to rearrange the immediate installation space; no major construction or demolition would be necessary.

The proposed project would involve the use of some inorganic acids and organic solvents including Hydrochloric acid (HCl), Sulfuric acid (H2SO4), Nitric acid (HNO3), Acetone, and Ethanol. However, these potentially hazardous substances

would be contained within either an acids cabinet or fume hood at all times, and proper chemical hygiene practices, written laboratory/chemical safety procedures, and personal protective equipment use would be observed at all times. Materials design would involve molecular or nanostructural modifications of carbon materials such as graphite. The materials themselves would be in bulk form and are not considered hazardous. Non-hazardous laboratory waste would be treated or disposed of according to local jurisdictions. Because the quantities of materials used at each site would be small (less than 1 liter for liquids and less than 100 grams for solids), there would be no significant increase in net disposal or treatment volume to be generated onsite. Caltech Chemical Safety services would be responsible for disposing of all hazardous waste according to local and federal regulations. No siting, construction or major expansion of waste storage, disposal, recovery, or treatment actions/facilities would be required.

Based on review of the project information and the above analysis, DOE has determined the activities associated with the proposed project would not have a significant individual or cumulative impact to human health and/or environment. DOE has determined the proposed project is consistent with actions contained in DOE categorical exclusion B3.6 "small-scale research and development, laboratory operations and pilot projects, B1.31 Installation or relocation of machinery and equipment, and B3.15 "small-scale indoor research and development projects using nanoscale materials" and is categorically excluded from further NEPA review.

NEPA PROVISION

DOE has made a final NEPA determination for this award

Insert the following language in the award:

If you intend to make changes to the scope or objective of your project you are required to contact the Project Officer identified in Block 11 of the Notice of Financial Assistance Award before proceeding. You must receive notification of approval from the DOE Contracting Officer prior to commencing with work beyond that currently approved.

Note to Specialist :

Fuel Cell Technologies Office
This NEPA determination does not require a tailored NEPA provision.
Review completed by Rebecca McCord, 5/7/2015

SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature: Electronically Signed By: Kristin Kerwin Date: 5/15/2015

NEPA Compliance Officer

FIELD OFFICE MANAGER DETERMINATION

☐ Field Office Manager review required

NCO REQUESTS THE FIELD OFFICE MANAGER REVIEW FOR THE FOLLOWING REASON:

☐ Proposed action fits within a categorical exclusion but involves a high profile or controversial issue that warrants Field Office Manager's attention.

☐ Proposed action falls within an EA or EIS category and therefore requires Field Office Manager's review and determination.

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

Field Office Manager's Signature: _____ Date: _____

Field Office Manager