Rec 10/8/15

(3)

MTSU Clean Energy Initiative Project Funding Request

There are five (5) sections of the request to complete before submitting. See http://www.mtsu.edu/~sga/cleanenergy.shtml for funding guidelines. Save completed form and email to cee@mtsu.edu or mail to MTSU Box 57.

1. General Information	
Name of Person Submitting Request Keying Ding	
Department/Office Chemistry	Phone # (Office) 615-898-2475
MTSU Box # x0068	Phone # (Cell) 612-961-4048
E-mail Keying.Ding@mtsu.edu	Submittal Date 10/06/15

2. Project Categories (Select One)			
Select the category that best describes the project.			
☐	Energy Conservation/Efficiency	☑	Sustainable Design
☐	Alternative Fuels	☑	Other Education
☑	Renewable Energy		

3. Project Information

a. Please provide a brief descriptive title for the project.
b. The project cost estimate is the expected cost of the project to be considered by the committee for approval, which may differ from the total project cost in the case of matching funding opportunities. **Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission.**
c. List the source of project cost estimates.
d. Provide a brief explanation in response to question regarding previous funding.

3a. Project Title
Bring Green Chemistry on Campus (III)

3b. Project Cost Estimate
$3,089

3c. Source of Estimate
a. Chemicals ($2,889, see attached quote); b. samples and poster printing cost ($200)

3d. If previous funding from this source was awarded, explain how this request differs?
The proposed project includes a new green chemistry research project and education activities to disseminate green chemistry around campus. see 4a.

4. Project Description

(Completed in as much detail as possible.)

a. The scope of the work to be accomplished is a detailed description of project activities.
b. The benefit statement describes the advantages of the project as relates to the selected project category.
c. The location of the project includes the name of the building, department, and/or specific location of where the project will be conducted on campus.
d. List any departments you anticipate to be involved. Were any departments consulted in preparation of this request? Who? A listing may be attached to this form when submitted.
e. Provide specific information on anticipated student involvement or benefit.
f. Provide information for anticipated future operating and/or maintenance requirements occurring as a result of the proposed project.
g. Provide any additional comments or information that may be pertinent to approval of the project funding request.

4a. Scope: Work to be accomplished

This proposed project contains two parts.
Part a. Deoxygenation of aldehyde or ketone to their saturated compounds has attracted large attentions given its broad applications in biofuel production. Classical methods for the deoxygenation of carbonyl compounds generally involve harsh reaction conditions, toxic reagents and poor chemical selectivities. Thus, "greener" and more atom efficient processes generate major interests in both academia and industry. In one of our recent project on hydrosilylation of ketone reaction, we discovered that some ketones can be reduced to alcohol first, then further reduced to alkane. These preliminary results provide us with great insight that our hydrosilylation catalyst might serve as deoxygenation catalyst as well. Big advantages of our method include (1) mild reaction conditions such as room temperature and ambient pressure; (2) use of industrial waste as silane source. Herein we are looking for financial support on chemical/supplies so that we can screen a large selection of ketone and aldehyde substrates to obtain deoxygenated products.

Part b. PI serves as MTSU chemistry society co-advisor. The students will be instructed to disseminate green chemistry knowledge to the public through outreach activities. We propose two major activities in the coming year: 1. Science Saturdays Demonstrations 2. Earth Day Demonstration. On each of the event, the students will run "green chemistry" demonstrations and present "green chemistry" posters. Current proposed demonstrations include (1) comparison between traditional detergent with phosphate and "green" dish detergent without phosphate; (2) bio-diesel demonstration.

4b. Scope: Benefit Statement

In fall 2013, the PI initiated the "Bring Green Chemistry to MTSU" program that includes activities of research, education and public outreach, aiming to develop new sustainable technology and educate the next generation of researchers within MTSU community. Past year's (2014) activities include:
1.A research on amine alcohol coupling reactions catalyzed by earth-abundant metals is ongoing. With the initial seed funds from Clean Energy program, we have successfully got preliminary results and this project is now under support from National Science Foundation. Without Clean Energy Program support, our success could not have been possible!
2.A well-known green chemistry scientist (Dr. Chris Jones from Georgia Tech) was invited to MTSU delivering a seminar on carbon dioxide utilization.
3.Chemistry society students presented "green" chemistry poster and demonstrations about sustainable polymers at Science Saturdays event and Earth day event.
4.MTSU Chemistry Society received Student Chapter Award from ACS for successfully completing green chemistry activities.
5. A "green chemistry" advocate letter was written by PI and chemistry society students to be submitted to President McPhee.
6. Two graduate students in PI's research group presented their research results at ACS National Meeting in fall 2015 on catalytic activities by nickel on graphite. This project is supported by Clean Energy program.

The proposed project includes two of the activities for this coming year. For part a, the research results will serve as preliminary data for major external funding application for NSF Career Award. Through part b, the PI is expected to disseminate green chemistry in MTSU and get more and more students involved and learn the importance of green chemistry to our daily lives. The proposed project will greatly contribute to "Bring Green Chemistry to MTSU" program that will ultimately benefit our MTSU community.

4. Project Description (continued)

4c. Location of Project (Building, etc.)

New Science Building, local public schools

4d. Participants and Roles

(part a) PI - conduct experiments, supervise students
Two graduate students - conduct experiments
Two undergraduate students - assist in lab, conduct experiments

(part b) PI - organize the events and serve as faculty advisor
MTSU Chemistry Society students - poster presentations and demonstrations

4e. Student participation and/or student benefit

Through this project, students will not only learn basic concepts of green and sustainable chemistry but also get hands-on research experiences in this field. We hope that through our proposed "Bring Green Chemistry to MTSU" program, more MTSU students will get involved and learn green chemistry. Most significantly, through this project, students can learn how green chemistry is so important and promising today and get interested in green chemistry, which will ultimately benefit our MTSU community.

4f. Future Operating and/or Maintenance Requirements

see 4a and 4b

4g. Additional Comments or Information Pertinent to the Proposed Project

5. Project Performance Information

Provide information if applicable.

a. Provide information on estimated annual energy savings stated in units such as kW, kWh, Btu, gallons, etc.
b. Provide information on estimated annual energy cost savings in monetary terms.
c. Provide information on any annual operating or other cost savings in monetary terms. Be specific.
d. Provide information about any matching or supplementary funding opportunities that are available. Identify all sources and explain.

5a. Estimated Annual Energy Savings (Estimated in kW, kWh, Btu, etc.)

N/A

5b. Annual Energy COST Savings ($)

N/A

5c. Annual Operating or Other Cost Savings. Specify. ($)

N/A

5d.Matching or Supplementary Funding (Identify and Explain)

N/A

SIGMA-ALDRICH

Order Preview(This order has not been submitted)

Web Copy

Billing Address MIDDLE TENNESSEE STATE UNIVERSITY Dept:MTSU 1500 GREENLAND DRIVE MURFREESBORO,TN 37128 United States	**Shipping Address** MIDDLE TENNESSEE STATE UNIVERSITY Dept:CHEMISTRY 1500 GREENLAND DRIVE MURFREESBORO,TN 37132 United States
Order Date:2015-10-07 **Purchase Order:** **Additional Reference:** **Payment Term:Prepaid - 1 day net**	**Contact Name:Keying Ding** **Contact Phone:6158982475** **Contact Email:keying.ding@mtsu.edu** **Email order confirmations to:**

Subtotal:2,523.50 USD
Ice/Special Packaging Charges:22.00 USD
Transportation/Handling:57.00 USD
Carrier Hazard Fee:30.00 USD
Tax:256.69 USD
Order Total:2,889.19 USD

Line	Product Number	Description	Qty	Your Reference	Your Price	Net Price
000010	W320218-100G-K	METHYL 2-PYRROLYL KETONE, >=98%, FG	1		225.00	225.00
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000020	A16254-100G	2-ACETYLFURAN, 99%	1		52.20	52.20
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000030	D222003-100G	DODECYL ALDEHYDE, 92%	1		61.80	61.80
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000040	451193-5G	NICKEL(II) CHLORIDE, ANHYDROUS, POWDER,&	1		152.50	152.50
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000050	335363-5G	(1,3-BIS(DIPHENYLPHOSPHINO)PROPANE)- &	1		65.90	65.90
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000060	716146-500MG	[FECL2BIS(DPPBZ)], 95%	1		58.40	58.40
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000070	148482-25G	DIPHENYLSILANE, 97%	1		95.90	95.90
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000080	D7384-25G	DECANAL	1		37.70	37.70
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000090	382051-1G	4-HYDROXY-3-METHOXYCINNAMALDEHYDE, 98%	1		56.70	56.70
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000100	143685-25G	3-HYDROXY-4-METHOXYBENZALDEHYDE, 99%	1		57.00	57.00
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000110	156167-1G	3-HYDROXY-4-NITROBENZALDEHYDE, 97%	1		45.60	45.60

		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000120	T12203-100ML	3-CYCLOHEXENE-1-CARBOXALDEHYDE, 97%	1		72.90	72.90
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000130	288993-100ML	ALPHA-AMYLCINNAMALDEHYDE, 97%, MIXTURE &	1		40.10	40.10
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000140	124915-25G	4-FORMYLBENZOIC ACID, 97%	1		111.50	111.50
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000150	516317-1G	3-ETHOXYBENZALDEHYDE, 98%	1		40.40	40.40
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000160	189839-5G	2,3-DIHYDROXYBENZALDEHYDE, 97%	1		47.60	47.60
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000170	250694-25G	ALPHA,ALPHA,ALPHA-TRIFLUORO-O- &	1		67.40	67.40
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000180	N16207-5G	TRANS-2-NITROCINNAMALDEHYDE, 97%	1		33.20	33.20
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000190	39070-50G	4-DIMETHYLAMINOBENZALDEHYDE	1		56.00	56.00
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000200	123714-25G	4-BENZYLOXYBENZALDEHYDE, 97%	1		39.70	39.70
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000210	274801-25G	3',4'-(METHYLENEDIOXY)ACETOPHENONE, 98%	1		117.50	117.50
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000220	CDS000680-100MG	4'-(PHENYLETHYNYL)ACETOPHENONE-	1		50.00	50.00
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000230	370630-5G	2,2,2-TRIFLUORO-3'-(TRIFLUOROMETHYL)- &	1		181.50	181.50
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000240	177458-1G	4-ACETYLBENZOIC ACID, 98%	1		35.50	35.50
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000250	M9602-5G	2-METHOXYACETOPHENONE, 95%	1		151.00	151.00
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000260	A37804-5G	2'-AMINOACETOPHENONE, 98%	1		37.50	37.50
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000270	272728-5G	BENZOYLACETONITRILE, 99%	1		44.10	44.10
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000280	156639-25G	3',4'-DIMETHOXYACETOPHENONE, 98%	1		31.90	31.90
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				
000290	H35803-10G	2'-HYDROXY-4'-METHOXYACETOPHENONE, 99%	1		83.00	83.00

		1 : Estimated to ship on 12/29/15 *Routing:FEDEX GROUND*				
000300	W501808-25G-K	5-(HYDROXYMETHYL)FURFURAL, >=99%, FG	1		374.00	374.00
		1 In Stock from MILWAUKEE 10/07/15 *Routing:FEDEX GROUND*				