ENERGIZE NEW MEXICO IMPACTS 2017

SUBJECT: The Power of Sunshine: Using photosynthesis to convert carbon dioxide to fuel

CATEGORY- Chose U.S./global economy, national security or scientific knowledge: Scientific knowledge, US economy & national security

NSF AWARD(S): #IIA-1301346 https://www.nsf.gov/awardsearch/showAward?AWD_ID=1301346

OTHER SUPPORTING INFORMATION:
https://www.nmepscor.org/science/solar-energy
http://pubs.acs.org/doi/abs/10.1021/acsami.5b06054

BRIEF SUMMARY OF OUTCOMES - (Why is this award compelling for use as an Impact?):
New Mexico EPSCoR researchers at New Mexico Institute of Mining and Technology are the first to test a never-before-used, earth-abundant, low-toxicity material, Zinc Sulfide (ZnS), to drive the conversion of atmospheric carbon dioxide (CO_2) into formate. Formate is a key intermediate substance to producing methanol, a fuel that can displace petroleum. Researchers found that ZnS may be a promising catalyst for larger-scale applications.

THREE REASONS this award outcome impacts U.S./global economy, national security or scientific knowledge:

- Using earth-abundant metals such as ZnS as catalysts helps scientists understand the process of photosynthesis—the process through which plants convert CO_2 into oxygen—and how we can replicate the process to create new types of fuels through solar-driven processes
- Chemical recycling of CO_2 to fuel contributes to reduction of fossil fuel use, which has implications for energy independence and climate change mitigation, both national security issues
- Cost-effectively converting CO_2 into formate is a key intermediate step toward a methanol economy; the difficulty of formate production has hindered scientific progress in the past, but can now be mitigated using materials that are easily found, low in toxins, and relatively inexpensive

NSF Directorate(s)/Division(s): OIA

State(s): New Mexico