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July 5, 2016

Honorable Lamar Smith
Chairman
House Committee on Science, Space & Technology
2409 Rayburn House Office Building
Washington, D.C. 20515

Honorable Eddie Bernice Johnson
Ranking Member
House Committee on Science, Space & Technology
2468 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Smith and Ranking Member Johnson,

I am writing to provide my strongest support for the Solar Fuels Innovation Act. Directed, use-inspired study by the nation's most talented and influential scientists with the common thread of solar fuels is our best hope to understand artificial and biological photosynthetic processes in order to enable a system with the ability to convert sunlight, water, and possibly other species into useable fuels, and that can be plugged seamlessly into our current infrastructure and at a cost that is competitive with fuels generated by non-renewable means.

Annual funding on this hundreds of million dollars scale is necessary to allow innovative game-changing technological strategies to be researched without the burden of spreading the money too thin across many research teams or picking winners from the outset by funding only a few teams at large dollar values. It is imperative that scientists are allowed to do what they do best and the Solar Fuels Innovation Act would afford them the opportunity to do so without undue burden of continually battling for today's resources to fund projects related to this great cause. A continued supply of funding for several years, and beyond, will allow the field and the science to progress toward our ultimate goal of an enabling technology and a sustainable infrastructure.

As an example, Nathan Lewis (Caltech) recently testified to your subcommittee and highlighted the urgent need for such research and development. He described a photosynthetic solution to the solar fuels challenge that did not look like a plant or a solar cell, but instead a material that resembled artificial turf and could be rolled out over large areas in a cost-effective manner to quickly and easily generate sunlight-driven clean fuel products. I bring this up because I am the only scientist in the United States funded by U.S. DOE EERE for research into designs that are



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projected as inexpensive strategies for solar hydrogen generation. While this technology currently has shortcomings in that the world-record energy-conversion efficiencies are much lower than the efficiency of plants, the projected cost benefits from such architectures suggests they should be heavily supported as probable next-generation enabling and practical technologies for the generation of solar fuels. However, with only a small amount of money available for this type of high-risk, but potentially highly impactful, research, little progress can be made. If we are to understand the physics and chemistry of such designs and realize a device that resembles artificial turf, then we need a large concerted national effort into the challenges affecting inexpensive solar fuels technologies from progressing, but taken from various angles and paths, including basic science and applied research, with optimistic convergence on an economical solar fuels technology.

Moreover, solar fuels is a broad field of study that ripe for training budding scientists. This is because solar fuels is highly multidisciplinary and therefore it exposes them to cutting-edge research in a large number of fundamental traditional science fields such as chemistry, physics, chemical engineering, materials science, biochemistry, etc. It gives students the complete STEM experience and allows them to gain the training required to tackle a large swath of problems bridging several disciplines. It is a great tool for introducing impactful and important science to the next generation of scientists, irrespective of their ultimate field of expertise.

In summary, I applaud you both for your support of these high risk, high reward research endeavors where fundamental science comprehension will be an assured outcome. I too support the Solar Fuels Innovation Act in totality. Global prosperity and international leadership require that we tackle this challenge head on and funding in support of this work at levels comparable to international support for similar research and development is required. Without it, the United States will relinquish its place as a leader in cutting edge science and technology research and development.

Sincerely,

A handwritten signature in blue ink, appearing to read "Shane Ardo".

Shane Ardo