UCLA Engineer's Research On CO2 Conversion Gets Boost From Japanese Chemical Company

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Perhaps no other researcher has had as much success as UCLA's James Liao in developing technology to turn carbon dioxide into products essential for the green economy. In particular, his innovative work engineering bacteria to convert CO2 into alcohols for use in biofuels and chemicals could help reduce greenhouse gas emissions and provide for cleaner, greener energy worldwide.

Now Liao, the Chancellor's Professor of Chemical and Biomolecular Engineering at the UCLA Henry Samueli School of Engineering and Applied Science, is being sponsored by the KAITEKI Institute Inc. (TKI) - a strategic arm of Mitsubishi Chemical Holdings Corp., Japan's largest chemical company - to research ways of recycling and converting CO2 into chemicals that can be used to produce a variety of industrial products, such as car bumpers, packaging materials, diapers and DVDs.

To address the global challenges in energy and the environment, TKI will fund Liao's research annually. Institute officials say they hope their work with Liao will continue for many years.

"We had been following the academic literature in this area and were impressed by the progress that Professor Liao reported in a series of high-profile articles, notably in the journal Nature," said Glenn Fredrickson, TKI's executive director and director of the UC Santa Barbara-based Mitsubishi Chemical Center for Advanced Materials.

"TKI identified UCLA and Professor Liao as our best partner to conduct research on the conversion of CO2 to chemicals using genetically modified algae," said Fredrickson, who is a chemical engineering professor at UC Santa Barbara. "The subject area of the research promotes the notion that UCLA - and UCLA Engineering - is among the world leaders in green, sustainable technologies."

In the last couple of years, Liao has received widespread attention for his work in developing methods for the production of more efficient biofuels by genetically modifying E. coli bacteria, and most recently, for modifying cyanobacterium to consume CO2 to produce the liquid fuel isobutanol. The reaction is powered directly by energy from sunlight, through photosynthesis.

"There is a worldwide need to recycle carbon dioxide in order to reduce the net amount of CO2 that is re-released into the atmosphere," Liao said. "Currently, companies are using petroleum as a raw material for both energy and chemicals. But eventually, petroleum will run out, so the best way to solve this problem is to recycle the CO2 we already have in the atmosphere. So far, no one makes useful chemicals from CO2 directly. It's exciting work that could be very beneficial."

As fossil-fuel resources become scarcer and more expensive and as greenhouse gas emissions are increasingly regulated worldwide, CO2 may become the ultimate carbon resource, according to TKI. The institute hopes to devise efficient and cost-effective means for synthesizing basic chemicals, chemical intermediates and materials such as polymers using plentiful CO2 and water as basic ingredients.

"The research project with Professor Liao opens up the possibility that we could not only derive our basic chemicals, plastics and materials from sunlight and water but also remediate CO2 in the process," Fredrickson said. "We felt Professor Liao's technology was the most advanced and had the most potential for producing a diverse set of valuable chemical compounds in an economically feasible way."

SOURCE [1]

Links:
[1] http://www.eurekalert.org/pub_releases/2010-05/uoc--uer050710.php