Multi-Junction Artificial Photosynthetic Cell With Enhanced Photovoltages

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OTHER INFORMATION

KEYWORDS

cenIEE, solar cell, photovoltaic, PV, indenergy, indadvmat, indfeat, indled

CATEGORIZED AS

- **Energy**
  - Hydrogen
  - Solar

RELATED CASES

2014-724-0, 2013-150-0

BACKGROUND

Development of stable electroactive units for electricity generation or production of fuels and chemicals is essential, as the development of environmentally and economically sustainable energy sources using solar energy is an important unmet challenge. Although there exist increasingly efficient and decreasingly costly semiconductors used in photovoltaic applications (e.g. Si, Cu2S, CdSe, CdTe, SnS etc.), a major challenge is stabilizing these high-efficiency materials against photo corrosion when operating in the electrochemical environment of a PEC cell. Accordingly, there remains a need to find reliable photoelectrochemical devices and methods for novel, carbon-neutral energy cycles using only sunlight as the energy input for solar-driven production of fuels and chemicals. Such devices and methods should be able to provide sufficient photovoltages while maximizing sunlight absorption and resisting the corrosive effects of a harsh electrochemical environment.

DESCRIPTION

UC Santa Barbara researchers have developed an innovative approach to harnessing solar energy for electricity generation and fuel production through multi-junction artificial photosynthetic cells. These novel units utilize simple, low-cost electrochemical approaches to achieve voltages sufficient for water splitting and/or CO2 reduction to fuels and chemicals. This efficient and stable method is compatible with existing solar cell technologies and opens new avenues for renewable energy applications including hydrogen generation, photovoltaic materials, and solar cells.

Patent: https://patents.google.com/patent/US10100415B2/

ADVANTAGES

- Highly scalable fabrication methodologies and processes
- Can be used with existing solar cell technologies

APPLICATIONS

- Photovoltaic materials
- Solar cells
- Hydrogen generation

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,100,415	10/16/2018	2014-724

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Molten Salt Chemical Looping Process for Efficient Chlorine Production from HCl
- Novel Carbon Dioxide-Free Hydrocarbon Conversion Processes and Reactor Technologies for Solid Carbon and Hydrogen Production

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