Efficient Solar Energy Conversion to Electricity

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ABSTRACT

Researchers at the University of California, Davis have developed a novel design for a solar power converter. The system uses an efficient selective absorber to harvest solar radiation.

FULL DESCRIPTION

Today, photovoltaic (PV) panels generate most of the market's renewable electricity. Unfortunately, PV generation has low conversion efficiencies, ~20%. Because solar cells have a theoretical maximum efficiency of 33%, they discard about 70% of sunlight as heat.

Researchers at the University of California, Davis have developed a novel absorber to convert nearly 100% of sunlight by using a low emissivity selective absorber, a material with high absorption in the solar spectrum and low emission in the infrared. The minimal infrared emission allows the material to retain more solar energy as heat. By using a heat engine, the harvested heat can then be used for efficient electrical generation. In theory, a selective absorber photothermal system can achieve efficiencies as high as 50%, more than doubling current PV efficiency.

APPLICATIONS

- Solar power conversion to electricity
- Photothermal applications

FEATURES/BENEFITS

- Simple in design when compared to other methods
- Does not require ultra-high concentration of sunlight
- Eliminates the need for passive or active cooling systems

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20190203661	07/04/2019	2016-721

INVENTORS

- Heredia, Cristian
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OTHER INFORMATION

KEYWORDS

energy conversion, solar power, hybrid power systems, photovoltaic systems, silicon, photothermal, selective absorber, low emissivity

CATEGORIZED AS

- **Energy**
  - Solar
- **Environment**
  - Other
- **Engineering**
  - Engineering

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