Postprint: Novel Photovoltaic Agricultural Technology Innovation, Institute of Advanced Technology, University of Science and Technology of China, 2017 R&D 100 Award

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Abstract

Full Text

Preamble

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The innovative technology "Novel Photovoltaic Agriculture Technology" developed by the Institute of Advanced Technology, University of Science and Technology of China received the 2017 R&D 100 Award.

This technology separates solar radiation through thin-film interference, dividing sunlight into two components. The spectrum primarily required for plant growth and photosynthesis is transmitted to support cultivation, while the remaining spectrum is reflected onto concentrator photovoltaic modules for power generation.

This approach enables simultaneous photovoltaic power generation without hindering plant growth, and may even improve crop quality and increase yields. Additionally, it effectively reduces water evaporation, conserving substantial irrigation water. The technology significantly enhances solar energy utilization and increases income for rural areas and farmers.

Discovery Channel praised this achievement, stating it "optimizes photosynthetic conditions for plant growth while simultaneously achieving photovoltaic power generation, representing an unprecedented efficient utilization of solar energy."

The R&D 100 Award is a significant event in the American scientific community and a highly respected honor in international research and development. The award is evaluated annually by renowned experts from various fields in the United States through a two-round selection process from thousands of global projects, based on criteria of significant technological breakthrough, innovative uniqueness, and practical applicability.

Additional Awards and Recognition: - APVIA Asian Photovoltaic Science and Technology Achievement Award (Academic Category) - Top Ten Highlights Gold Award at the Shanghai Photovoltaic Exhibition (SNEC) - Outstanding Team Award at the 4th China Innovation and Entrepreneurship Competition - Gold Medal at the Geneva International Invention Exhibition

Media Coverage: The project was featured in the Discovery Channel documentary "Smart China," which aired globally during the Hangzhou Summit.

Demonstration Projects: - Agricultural photovoltaic experimental and demonstration system at the Institute of Advanced Technology, University of Science and Technology of China - Research project supporting the Institute of Botany, Chinese Academy of Sciences in Hailar Grassland, Inner Mongolia, investigating the effects of spectral regulation on forage grasses - 1.3 kW agricultural photovoltaic demonstration project in Xiantao City, Hubei Province

Note: Figure translations are in progress. See original paper for figures.