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Tunable Plasmonic Structures

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Inventors

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Background

Solar power is one of the fastest growing renewable sources of energy and is fast becoming one of the largest markets in the global energy business. The continued growth and success of this technology will depend on its ability to improve efficiency of current generation and decrease in manufacturing costs. Solar cells, or photovoltaic cells, are a subset of a larger group of optoelectronic devices called photodetectors. Photodetectors are sensors that detect light or other electromagnetic energy. They are used in a wide variety of products including cell phone cameras, CD players, smoke detectors, remote controls, televisions, and many more. Current levels of efficiency and manufacturing costs have held back the full potential of several types of photodetectors.

Invention Description

Researchers at Arizona State University have developed a new method that will increase the efficiency and absorption of photosensors through the use of plasmonic layers of interconnected metal nanoparticles disposed on a substrate. Combining this with dendritic electrode growth, allows for tunable plasmonic structures that can have enhanced light capturing ability across a wide spectrum spanning the UV and visible light range. This greatly increases the efficiency of solar cells and optical sensors. For example, it is predicted that a photovoltaic layer could be thinned as much as 100x while maintaining efficiency using plasmonic techniques.

Intellectual Property Status:
Patent Pending

Potential Applications

- Photovoltaic cells
- Photoresistors
- Photodetectors
- Optical Sensors

Benefits and Advantages

- Captures more light across a broad spectral range
- Increased efficiency in optical sensors and solar cells
- Tunable plasmonic structures
- Allows for thinner PV cells decreasing fabrication costs

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