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(57) Abstract :

The current invention presents a pioneering approach to photovoltaic cell technology by harnessing the exceptional properties of nanomaterials to significantly enhance the efficiency of solar energy conversion. This innovation involves nanomaterial-based photovoltaic cells that integrate quantum dots, nanowires, and nanostructures within their photoactive layers. These nanomaterials demonstrate size-dependent properties, such as enhanced light absorption and charge carrier transport, leading to substantial improvements in energy conversion efficiency. The invention expands the absorption spectrum of photovoltaic cells, ensuring the utilization of a broader range of solar wavelengths, including the infrared and ultraviolet regions. The manufacturing method involves precise deposition and sintering techniques to create a durable and efficient cell structure. By achieving these advancements, the invention contributes to the evolution of clean energy technologies, paving the way for more efficient, sustainable, and economically viable solar energy solutions.

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