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Solar 3.0: Advancements in Perovskite Solar Cells for Efficient, Scalable, and Sustainable Energy Harvesting

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Abstract: *Solar energy has emerged as a key player in the global shift towards renewable and sustainable energy sources. Solar 3.0 represents the next generation of solar technology, characterized by significant advancements in efficiency, scalability, and integration capabilities. This research paper explores the evolution of solar energy and investigates the key innovations and potential of Solar 3.0 to drive a sustainable energy revolution. The paper examines the current state of solar technology, including photovoltaic (PV) systems and concentrated solar power (CSP), and highlights the challenges and opportunities associated with Solar 3.0. Furthermore, it discusses emerging trends such as perovskite solar cells, solar-powered agriculture, and solar energy storage, underscoring the transformative potential of Solar 3.0 for achieving global energy sustainability. Finally, the paper concludes with a discussion on the economic, environmental, and social implications of Solar 3.0, emphasizing the need for continued research, investment, and policy support to maximize its benefits.*

Keywords: Perovskite solar cells, Solar 3.0, Efficiency, Scalability, Stability, Sustainability

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