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Advancements in Solar Cell Technologies: From Efficiency Breakthroughs to Novel Materials and Manufacturing Processes

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Message from the Guest Editors

Tapping the vast energy available from the sun in the form of electricity and chemical fuels has tremendous potential to address the global energy supply and climate change. Over the years, power conversion efficiencies have drastically improved due to both material innovation and advanced processing techniques. Further advancements in solar cell technologies are crucial to reducing the total cost of solar energy.

Perovskite-based solar cells are characterized by their low-cost fabrication and exceptional light-absorption properties. They demonstrated excellent efficiency improvements within a very short timespan. However, CIGS-, CZTS-, and Sb_2Se_3 -based solar cells have the potential to become next-generation solar cells due to the advantages of abundant and environmentally friendly materials. These thin-film-technology-based solar cells offer a pathway to efficient energy conversion while addressing resource constraints. Continuous research is highly desired to enhance their performance, stability, and scalability, as well as to reduce costs.



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Message from the Editor-in-Chief

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