

Solution-processed optoelectronics

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Abstract

Solution-processed photovoltaics offer a cost-effective path to harvesting the abundant resource that is solar energy. The organic and polymer semiconductors at the heart of these devices generally absorb visible light; however, half of the Sun's power reaching the Earth's surface lies in the infrared. Flexible solar cells that harvest wavelengths beyond 1 μm were first reported in 2005. In three years they have increased over 10,000-fold in power conversion efficiency. The latest devices achieve power conversion efficiencies in the infrared of greater than 4%, values comparable to those of their organic and polymer counterparts in the visible. We will review the progress and prospects for the field, focusing on new insights into how quantum-dot solar cells operate and how these findings give guidance on optimizing these devices to their full performance potential.

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