

Special Issue

Organic Photovoltaics: From Lab to Fab

Message from the Guest Editor

The efficiency of lab-based, small-area organic photovoltaic (OPV) devices has steadily increased over the last 15 years, increasing from 16% in 2019. As encouraging as these results might be, however, such devices fail to meet most of the demands for a commercially viable technology, due to the fact that several requirements for the upscaling of fabrication have not yet been met. There are several key issues that OPV technology needs to address in order to achieve a reliable lab-to-fab transfer, such as i) fabrication at reduced cost using processing techniques compatible with vacuum-free and roll-to-roll (R2R); ii) use of green environmentally friendly solvents for active layer deposition, replacing the halogenated solvents commonly used at lab scales; iii) development of alternatives to replace indium tin oxide (ITO)—commonly used as transparent conductive electrode—due to its high cost and modest flexibility and conductivity, which limit current extraction in large-area flexible devices; and iv) development of new patterning strategies to connect single cells into large modules, so as to minimize the upscaling performance losses.

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