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Fabrication and Outdoor Testing of Organic Luminescent Solar Concentrators for Photovoltaics[1] CHUNHUA WANG, WEIYA ZHANG, LUN JIANG, ROLAND WINSTON, University of California, Merced — The cost of photovoltaic power can be reduced with organic luminescent solar concentrators (LSCs). These are planar waveguides with organic dyes cast inside and inorganic photovoltaic solar cells attached to the edges. This is the only known solar concentrator that can achieve high concentration without tracking the Sun. We report the outdoor performance of these LSCs with a 4x electrical gain. We also test their performance with optimization methods: (1) Attaching a white and black diffuser at the bottom of the LSCs, (2) adding optical refractive index matched gel between the LSC edges and the PV cells surface for stacked LSCs. The performance of LSCs as windows on cloudy and sunny days is also analyzed. The results show that they can perform very well for both direct and diffuse light. The LSCs can be applied as "smart" windows by integrating into buildings to collect and convert solar energy into electrical power with the function of normal windows.

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