Silicone Waveguide for Solar Applications With High Concentration

Title: Silicone waveguide for solar applications with high concentration

Invention: Researchers at the University of Arizona have developed low-cost silicone-based optical light guides configured to concentrate sunlight onto photovoltaic cells with above 90% optical efficiency. The fabrication is inexpensive, affords flexibility, and ease of assembly. Integration of multiple light guides enjoys relaxed alignment tolerances compared to glass.

Background: In solar applications, waveguides and/or lightguides are often used to redirect and spatially concentrate the sunlight onto photovoltaic cell (PV-cells). Glass lightguides can be utilized, but can be expensive and complex to fabricate, especially when small geometrical features are required. Assembly of a plurality of glass-based lightguides into a full system is also tedious and complicated. Polymeric materials can address some of these issues, are well known to have a relatively high level of absorbance in the UV and NIR regions of the solar spectrum, when high transmittance is needed.

Applications:

- Solar Applications

Advantages:

- Transparent in the 300-1700nm region
- UV resistant
- Design flexibility
- Reduces the cost of manufacturing/mass production
- High transmission throughout the solar spectrum

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• Improved tolerance to misalignment while maintaining over 90% optical efficiency

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