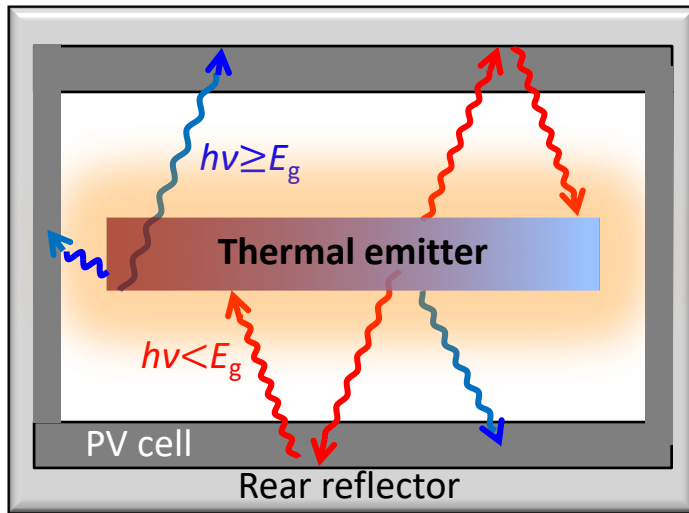


A New Thermophotovoltaic Efficiency Record

Regenerative TPV Concept



Scientific Achievement

We demonstrated the viability of regenerative thermophotovoltaics (TPV) with a record 29.1% efficiency, opening up the possibility of ultralight, highly efficient engines.

Significance and Impact

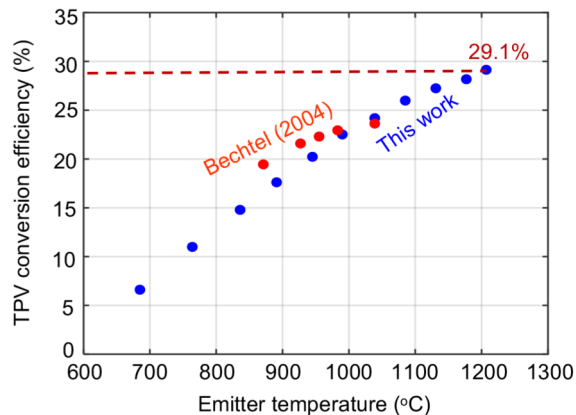
TPV efficiency has been stuck at 23% for the last 15 years. With our insight on the importance of rear mirror to achieve high efficiency, we achieved a record conversion efficiency and identified a pathway to achieve >50% efficiency.

Research Details

- TPV energy conversion utilizes photovoltaic (PV) cells to extract electricity from the thermal emission of a hot emitter
- A highly reflective mirror at the back of the PV cell can reflect any unabsorbed photons back to the thermal source where it can be absorbed and regenerated. This readily increases the energy conversion efficiency in thermophotovoltaics.

Z. Omair, G. Scranton, L. M. Pazos-Outon, T. P. Xiao, M. A. Steiner, V. Ganapati, P. F. Peterson, J. Holzrichter, H. Atwater, and E. Yablonovitch, PNAS **116**, 15356-15361 (2019).

New efficiency record at 1207 °C



Work was performed at UC Berkeley and Caltech

