Silicon thermophotovoltaic cell with high photon utilization

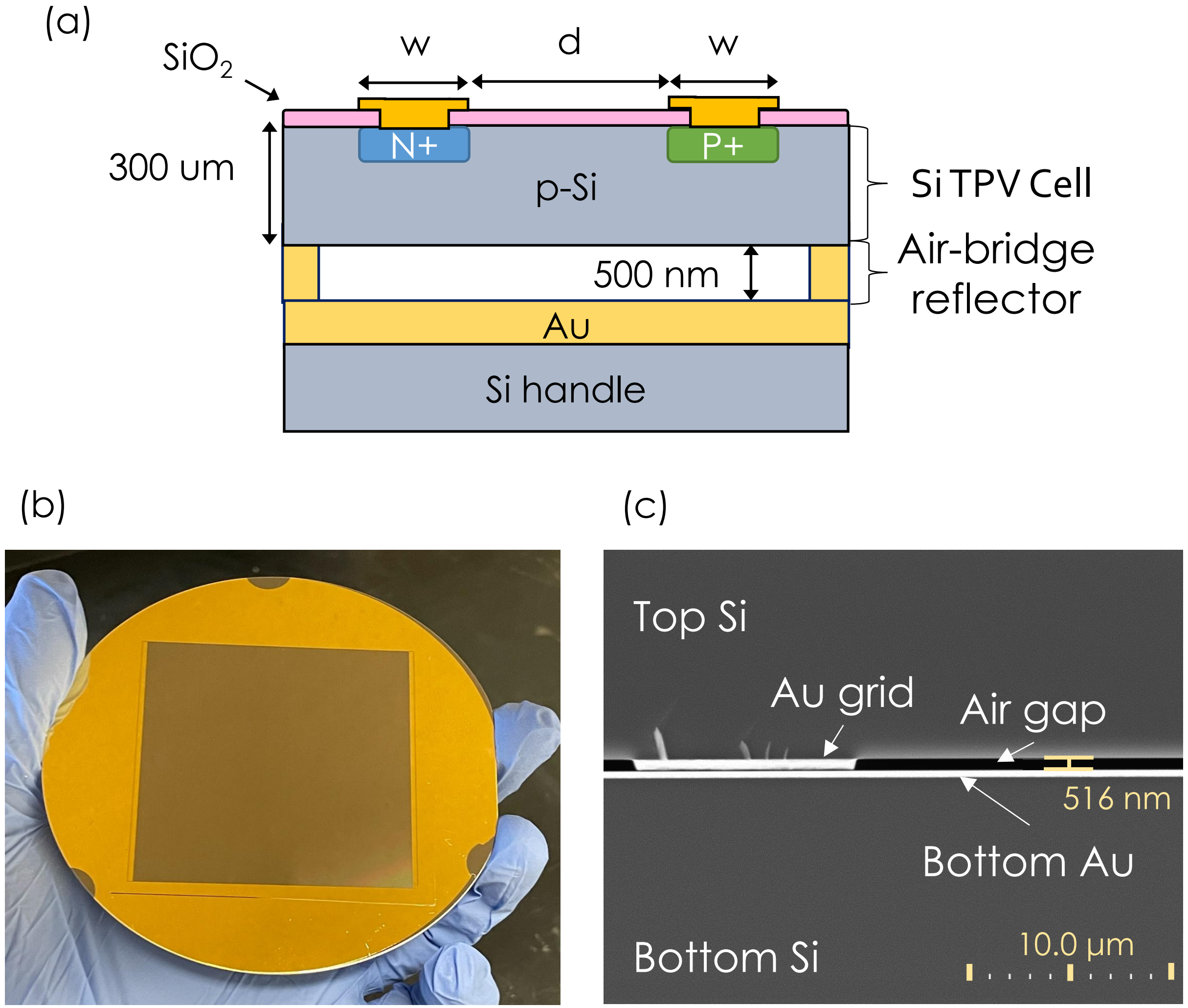

Figure: (a) Air-bridge Si TPV schematic (b) picture of 4" scale silicon air bridge (c) SEM image of air-bridge reflector and Au support

Objective

➢ To develop a high-efficiency silicon thermophotovoltaic cell and demonstrate scalability to 100W

Impact

Highly efficiency silicon TPV devices can be used for high temperature (1500-2000 K) heat to electricity energy conversion, both providing and supporting unique methods of clean energy generation and storage.

Facilities and Methods Used

- Silicon high-temperature processing furnaces
- Cold-weld bonding
- Photolithography
- Metal evaporation
- Sputtering
- Chemical vapor deposition

Relevant Papers

- B. Lee and R. Lentz et al., *ACS Energy Lett.*, DOI:10.1021/acsenergylett.2c01075 (2022)
- D Fan et al., *Nature*, DOI: 10.1038/s41586-020-2717-7 (2020)

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