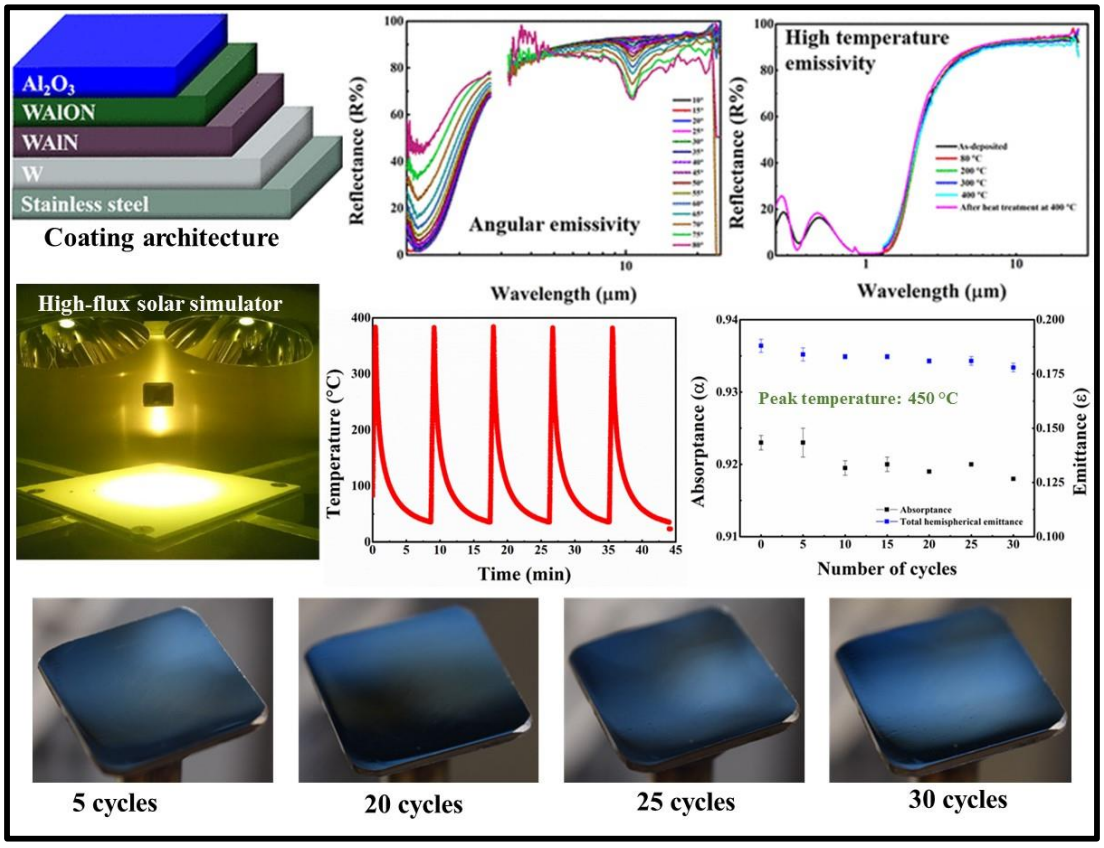
A. Dan, A. Soum-Glaude, A. Carling-Plaza, C. K. Ho, K. Chattopadhyay, H. C. Barshilia and Bikramjit Basu, Temperature and angle-dependent emissivity and thermal shock resistance of W/WAlN/WAlON/Al_2O_3 -based spectrally selective absorber; **ACS Applied Energy Materials** 2 (2019) 5557-5567.

Graphical Summary:



Significance/Impact

Spectral emissivity is considered as one of the most critical thermophysical properties, influencing the photothermal conversion efficiency of solar selective absorbers. This study suggests that hemispherical emissivity can be well approximated from near-normal emissivity values by avoiding complex angular measurement procedures. Importantly, one can achieve a combination of high solar absorptance (0.90) and good heliothermal efficiency (η=87%) at 500 °C for the W/WAlN/WAlON/Al_2O_3 absorber. Thermal cycling tests at Sandia National Laboratory in high heat flux (40–60 kW/m^2) in solar simulator confirmed the efficacy for high-temperature applications.