

**SPECTRALLY SELECTIVE SI/SIO₂ BASED FILTERS FOR
THERMOPHOTOVOLTAIC DEVICES**

Farhad Kazemi Khosroshahi¹, Hakan Ertürk^{1*}, M. Pınar Mengüç^{2*}

¹ Boğaziçi University, Department of Mechanical Engineering Bebek, 34342, Istanbul Turkey

² Özyeğin University, Department of Mechanical Engineering Çekmeköy, 34794, Istanbul
Turkey

ABSTRACT. Design of a spectrally selective filter based on one-dimensional Si/SiO₂ layers is considered for thermo-photovoltaic (TPV) devices. Spectrally selective filters transmit only the convertible radiation from the emitter as non-convertible radiation leads to a reduction in cell efficiency due to heating. The presented Si/SiO₂ based filter concept reflects the major part of the undesired range back to the emitter to minimize energy required and it is adaptable to different types of cells and emitters with different temperatures since its cut-off wavelength can be tuned. This study focuses on InGaSb based TPV cell and the predictions show that significant enhancement in overall system and device efficiency is possible by using such filters with TPV devices. Transmittance of the structure is obtained by RCWA method. Global optimization algorithm is used to find the best possible filter structure by considering the overall efficiency as an objective function.