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Modeling Thermo-Photo-Voltaic Selective Emitter Based on a Semi-Transparent Emitter with Integrated Narrow Band-Pass Pre-Filter

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Abstract : This work is a parametric study combining simple and well known optical theories. These simple theories are arranged to form part of one answer to the question: “Can a semi-transparent Thermo-Photo-Voltaic (TPV) emitter have an optical extinction spectrum so much greater than its optical absorption spectrum that it becomes its own band-pass pre-filter, and if so, how well might it be expected to suppress light of undesired wavelengths?” In the report, hypothetical materials and operating temperatures will be used for comparative analyses only. Thermal emission properties of these hypothetical materials were created using two openly available FORTRAN programs. Results indicate that if using highly transparent materials it may be possible to create a thermal emitter that is its own band-pass pre-filter.

Keywords : Christensen effect, DISORT, index of refraction, scattering
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