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Design and Fabrication of Spectrally Selective Emitter for Thermophotovoltaic System by using Nano-Imprint Lithography

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HIGHLIGHTS

- Some design rules based on finite difference time domain simulation results for 2D tungsten selective emitter are presented.
- New process, nanoimprint lithography (NIL) method with minimal process steps is used to fabricate a large-area selective thermal W emitter.
- Fabricated W selective emitter shows thermal stability at 1,300K.
- Compared with bare W, total efficiency of TPV system which is using the 2D tungsten selective emitter had almost 2.5 times enhanced

Abstract

Thermophotovoltaic (TPV) systems have attracted attention as promising power generation systems that can directly convert the radiant energy produced by the combustion of fuel into electrical energy. However, there is a fundamental limit of their conversion efficiency due to the broadband distribution of the radiant spectrum. To overcome this problem, several spectrally selective thermal emitter technologies have been investigated, including the fabrication of photonic crystal (PhC) structures. In

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