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26 September 2016 Energy dynamics of solar thermionic power conversion with emitter of graphene

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Abstract

In this paper we considered in details of the energy exchanges that would take place when concentrated solar energy is focused normally onto a thermionic emitter of area equal to the area of focus with solar energy being incident parallel to the axis of the parabolic mirror. We then, using a simplified version of the equations, compute the power output from the thermionic energy converter with emitters of graphene on silicon carbide, assuming that with the advent of new work function engineering technology the work function of graphene can be modulated from 4.5 eV to 1.5 eV and also with pure monolayer graphene for which a new thermionic emission equation has been discovered by the authors. Our theoretical research shows that graphene being a high temperature material, it is quite possible to practically realize a solar thermionic energy converter with good conversion efficiency using a graphene-on-silicon carbide emitter.

Conference Presentation



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