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| Title | Numerical investigation on the effect of different parameters in enhancing heat transfer performance of photovoltaic thermal systems | | |
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| Abstract |  |
| Photovoltaic thermal (PV/T) collectors that supply both electricity and heat are growingly becoming popular in household and other applications. However, efficient heat removal from backside of PV module is still a challenge that hampers its electrical as well as thermal performance. In the present research, an absorber-plate less thermal collector has been introduced and mathematical model of such a PV/T system has been developed, which is employed in COMSOL Multiphysics® software to simulate the heat transfer phenomenon in the system. Effect of different flow parameters on heat transfer and PV/T performance is thus studied numerically in the developed simulation model. Also, the effect of irradiation level and depth of the flow channel has been examined on the thermal as well as electrical performance of the module. Results reveal that PV/T electrical and thermal efficiency increase with both of Reynolds and Prandtl number. Heat transfer rate is observed to increase as high as 25.5% with increasing Reynolds number. A maximum reduction in cell temperature of 10.2 \_C is obtained by increasing the channel depth. Elimination of absorber plate from thermal collector simplified the design reducing its weight and cost as well. | |