

Demonstrating a Metallic Hot Carrier Solar Cell

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The hot carrier solar cell has the potential for high efficiency and has recently been demonstrated experimentally in using both semiconductor and metallic absorbers. The latter is particularly interesting from the viewpoint of thin solar cells since a metal layer of only a few tens of nanometres can almost completely absorb broadband sunlight. Experimental hot carrier IV data has been measured from a chromium absorber deposited onto a GaAs based tunnel diode. Importantly the data confirm that the photo current arises from a hot carrier population as opposed to internal photoemission; the distinction being significant since only a hot carrier device can attain high power conversion efficiency. The prospects for the technology as a realistic PV device will be discussed together with alternative applications such as photon energy resolving photodetection.