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(57) Abstract :

The present disclosure pertains to a two-dimensional perovskite junction-less heterojunction tunnel field-effect transistor 100 having induced charge carriers. The junction-less transistor 100 includes a source region 108-1, a drain region 108-3, and a channel region 108-2, where the channel region 108-2 can be configured to facilitate controlled flow of the charge carriers between the source region 108-1 and the drain region 108-3. The transistor 100 can be configured from bis-(phenethyl ammonium)-methyl ammonium lead iodide ($C_6H_5(CH_2)_2NH_3)_2(CH_3NH_3)_n-1PbnI(3n+1)$), where the source region 108-1, the drain region 108-3, and the channel region 108-2 can be constituted from a first set of layers having a first work function, and a second set of layers and a third set of layers having a second work function distinct from the first work function, thereby facilitating the flow of the charge carriers between the source region 108-1 and the drain region 108-3.

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