

ABSTRACT OF THE DISCLOSURE

In a field emission-type electron source (10), a strong field drift layer (6) and a surface electrode (7) consisting of a gold thin film are provided on an n-type silicon substrate (1). An ohmic electrode (2) is provided on the back surface of the n-type silicon substrate (1). A direct current voltage is applied so that the surface electrode (7) becomes positive in potential relevant to the ohmic electrode (2). In this manner, electrons injected from the ohmic electrode (2) into the strong field drift layer (6) via the n-type silicon substrate (6) drift in the strong field drift layer (6), and is emitted to the outside via the surface electrode (7). The strong field drift layer (6) has: a number of semiconductor nanocrystals (63) of nano-meter order formed partly of a semiconductor layer configuring the strong field drift layer (6); and a number of insulating films (64) each of which is formed on the surface of each of the semiconductor nanocrystals (63) and each having film thickness to an extent such that an electron tunneling phenomenon occurs.



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