

ABSTRACT

In a field emission-type electron source (10), lower electrodes (8) made of an electroconductive layer, a strong field drift layer (6) including drift portions (6a) made of an oxidized or nitrided porous semiconductor, and surface electrodes (7) made of a metal layer are provided on an upper side of a dielectric substrate (11) made of glass. When voltage is applied to cause the surface electrodes (7) to be anodic with respect to the lower electrodes (8), electrons injected from the lower electrodes (8) to the strong field drift layer (6) are led to drift through the strong field drift layer (6) and are emitted outside through the surface electrodes (7). A pn-junction semiconductor layer composed of an n-layer (21) and a p-layer (22) is provided between the lower electrode (8) and the strong field drift layer (6) to prevent a leakage current from flowing to the surface electrode (7) from the lower electrode (8), thereby reducing amount of power consumption.