Title (en)

CONFINED ELECTRON FIELD EMISSION DEVICE AND FABRICATION PROCESS

Title (de)

GESCHLOSSENE ELEKTRONENFELDEMISSIONSVORRICHTUNG UND VERFAHREN ZUR HERSTELLUNG

Title (fr)

DISPOSITIF A EMISSION DE CHAMP D'ELECTRONS CONFINES ET SON PROCEDE DE FABRICATION

Publication

EP 1055248 A1 20001129 (EN)

Application

EP 99906784 A 19990206

Priority

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Abstract (en)

[origin: WO9940604A1] A lateral-emitter field emission device (10) has a gate (60) that is separated by an insulating layer (80) from a vaccum- or gas-filled microchamber environment (20) containing other elements of the device (10). For example, the gate (60) may be disposed external to the microchamber (20). The insulating layer (80) is disposed such that there is no vaccum- or gas-filled path to the gate for electrons that are emitted from a lateral emitter (40, 100). The insulating layer (70, 80) disposed between the emitter and the gate preferably comprises a material having a dielectric constant greater than one. The insulating layer also preferably has a low secondary electron yield over the device's operative range of electron energies. For display applications, the insulating layer is preferably transparent. Emitted electrons are confined to the microchamber (20) containing their emitter (100). Thus, the gate current component of the emitter current consists of displacement current only. This displacement current is a result of any change in potential of the gate relative to other elements such as, for example, relative to the emitter. Direct electron current from the emitter to the gate is prevented. An array of the devices comprises an array of microchambers, so that electron current from each emitter (100) can reach only the anode (50, 55) in the same microchamber, even for diode devices lacking a gate electrode (60). A fabrication process (S1-S28) is specially adapted for fabricating the device and arrays of such devices.

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H01J 21/10; H01J 3/02; H01J 9/02

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