

Title (en)
Field emission cathode structure and method for production thereof

Title (de)
Feldemissionskathodenstruktur und Herstellungsverfahren

Title (fr)
Structure de cathode à émission de champ et méthode de fabrication

Publication
EP 0639847 B1 19970625 (EN)

Application
EP 94306076 A 19940817

Priority
• JP 20316793 A 19930817
• JP 33204393 A 19931227

Abstract (en)
[origin: EP0639847A1] A field emission cathode which comprises an emitter provided with a sharp point for emission of electrons and a controlling gate electrode is composed of a supporting substrate (17), an emitter material layer (18) formed of an emitter material, superposed on and attached fast to the supporting substrate, and provided with an emitter hole (18a), an insulator layer (13) so formed on the surface of the emitter material layer (18) as to expose the tip part of the emitter projection (18a) therethrough, and an impurity diffusion layer (12) formed on the surface of the insulator layer (13) and enabled to function as an etching stopper layer. The method for the production of the field emission cathode comprises a step of forming a first hole (11a) pointed toward the tip thereof on a first supporting substrate (11), a step of forming the impurity diffusion layer (12) on the surface of the first supporting substrate (11), a step of forming the insulator layer (13) on the surface of the impurity diffusion layer (12), a step of depositing an emitter material layer (18) on the surface of the insulator layer including a hole while filling the hole with an emitter material thereby giving rise to a laminate, a step of integrally joining a second supporting substrate (17) to the surface of the emitter material layer (18) of the laminate, a step of removing by etching the first supporting substrate (11) thereby exposing the surface of the impurity diffusion layer (12) including the projection corresponding to the first hole (11a), and a step of selectively removing the impurity diffusion layer (12) and the insulator layer (13) thereby exposing a tip (18t) of the projection (18a) of the emitter layer (18). <IMAGE>

IPC 1-7
H01J 1/00; **H01J 1/30**; **H01J 9/02**; **H01L 21/28**

IPC 8 full level
H01J 1/30 (2006.01); **H01J 1/304** (2006.01); **H01J 9/02** (2006.01)

CPC (source: EP)
H01J 1/3042 (2013.01); **H01J 9/025** (2013.01)

Cited by
US6097139A; US6057636A; EP0707333A1; US5795208A; EP0708472A1; US5599749A; US6963160B2; WO2004015362A3; WO03058668A3

Designated contracting state (EPC)
DE FR GB

DOCDB simple family (publication)
EP 0639847 A1 19950222; **EP 0639847 B1 19970625**; DE 69403940 D1 19970731; DE 69403940 T2 19971211; JP 3231528 B2 20011126; JP H07111132 A 19950425

DOCDB simple family (application)
EP 94306076 A 19940817; DE 69403940 T 19940817; JP 33204393 A 19931227