

442. 标题: Electron emission Si-based resonant-tunneling diode

作者: Evtukh, A (Evtukh, A.); Litovchenko, V (Litovchenko, V.); Goncharuk, N (Goncharuk, N.); Mimura, H (Mimura, H.)

来源出版物: JOURNAL OF VACUUM SCIENCE & TECHNOLOGY B 卷: 30 期: 2 文献号: 022207 DOI: 10.1116/1.3693977 出版年: MAR 2012

在 Web of Science 中的被引频次: 0

被引频次合计: 0

引用的参考文献数: 22

摘要: A new type of field emission resonant tunneling diode has been proposed and investigated both theoretically and experimentally. The diode is based on an Si-SiO_x-Si multilayer cathode containing an SiO_x layer as the input potential barrier, an Si layer as the quantum well, and a vacuum layer as the output potential barrier of a double barrier quantum structure. The calculation predicted the existence of the resonant maxima (three or four depending on the input barrier height) of the current density-electric field dependencies. Frequency dependencies of the diode microwave impedance pointed to the existence of negative conductance resulting from resonant tunneling through an energy level in the quantum well (QW) at electron transit angle values in the interval from zero up to near $2\pi/3$. Also found is a peak of negative conductance on the frequency dependence with the greatest peak value similar to 57 S/cm at a frequency of 0.63 THz. The maximum upper frequency of the negative conductance band of more than 2 THz at a transit angle near 0.45π is reached when resonant tunneling occurs through the third resonant level in the QW. Experimental results confirmed the existence of the resonance peak in the investigated resonant-tunneling structure. (C) 2012 American Vacuum Society. [http://dx.doi.org/10.1116/1.3693977]

入藏号: WOS:000302219500060

语种: English

文献类型: Article

KeyWords Plus: FIELD-EMISSION; LAYERS

地址: [Evtukh, A.; Litovchenko, V.] V Lashkaryov Inst Semicond Phys, UA-03028 Kiev, Ukraine

[Goncharuk, N.] Res Inst Orion, UA-03057 Kiev, Ukraine

[Mimura, H.] Shizuoka Univ, Elect Res Inst, Naka Ku, Hamamatsu, Shizuoka, Japan

通讯作者地址: Evtukh, A (通讯作者), V Lashkaryov Inst Semicond Phys, 41 Prospekt Nauki, UA-03028 Kiev, Ukraine

电子邮件地址: evtukh@rambler.ru; mimura@rie.shizuoka.ac.jp

出版商: A V S AMER INST PHYSICS

出版商地址: STE 1 NO 1, 2 HUNTINGTON QUADRANGLE, MELVILLE, NY 11747-4502 USA

Web of Science 分类: Engineering, Electrical & Electronic; Nanoscience & Nanotechnology; Physics, Applied

学科类别: Engineering; Science & Technology - Other Topics; Physics

IDS 号: 917ZV

ISSN: 1071-1023

29 字符的来源出版物名称缩写: J VAC SCI TECHNOL B

ISO 来源出版物缩写: J. Vac. Sci. Technol. B

来源出版物页码计数: 8