

Abstract Submitted
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A field-emission based vacuum device for the generation of THz waves¹ MING-CHIEH LIN, KUO-HUA HUANG, PU-SHIH LU, PEI-YI LIN, RUEI-FU JAO, NanoScience Simulation Laboratory, Department of Physics, Fu Jen University — Terahertz waves have been used to characterize the electronic, vibrational and compositional properties of solid, liquid and gas phase materials during the past decade. More and more applications in imaging science and technology call for the well development of THz wave sources. Amplification and generation of a high frequency electromagnetic wave are a common interest of field emission based devices. In the present work, we propose a vacuum electronic device based on field emission mechanism for the generation of THz waves. To verify our thinking and designs, the cold tests and the hot tests have been studied via the simulation tools, SUPERFISH and MAGIC. In the hot tests, two types of electron emission mechanisms are considered. One is the field emission and the other is the explosive emission. The preliminary design of the device is carried out and tested by the numerical simulations. The simulation results show that an electronic efficiency up to 4% can be achieved without employing any magnetic circuits.

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