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The influence of carbon layer on the field emission properties of tungsten nanotip at nanogaps

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With the rapid miniaturization and integration of electronic and electromechanical devices, especially for vacuum micro/nano electronic devices, it is urgent to study the influence of electrode surface condition on the field emission behaviors at nanoscale and explore its underlying principle. In this paper, the influence of surface carbon layer on field emission of tungsten nanotip was studied based on the in-situ transmission electron microscopy (TEM). Results show that compared to the field emission of nanotip without carbon layer, the presence of carbon layer depressed the field emission characteristics significantly, and during the field emission of nanotip with carbon layer, the soft breakdown (SBD) and hard breakdown (HBD) phenomenon was observed. The results presented in this paper would be of a great help for better understanding the physical mechanism of field emission at nanoscale.

Topic

Field Emission

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