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Abstract:The electron emission properties of an array of ZnO nanowires were studied in the temperature range of 300-473 K. An almost doubling of the current density at 473 K under an electric field of 8 V/um (j(T=473 K) = 190 uA/cm2, j(T=300 K) = 114 uA/cm2) was observed together with a reduction of the turn-on field from 552 V/um to 482 V/um. Theoretical model that combines the thermal-field emission for high electric field and the Schottky emission for the low field can satisfactorily account for temperature dependence of current at low as well as at high applied bias. The obtained effect is particularly appealing for the application in micro-gun for THz vacuum tubes.
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