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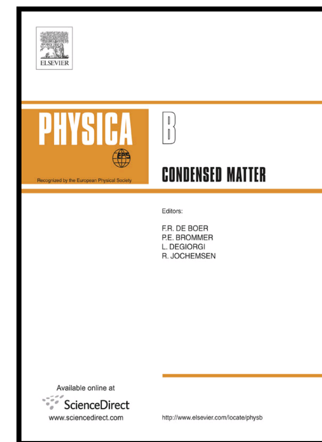

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Comparison of nickel, cobalt, palladium, and tungsten Schottky contacts on n-4*H*-silicon carbide

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Abstract

We have investigated the current-voltage (*I-V*) characteristics of nickel (Ni), cobalt (Co), tungsten (W) and palladium (Pd) Schottky contacts on n-type 4*H*-SiC in the 300-800 K temperature range. Results extracted from *I-V* measurements of Schottky barrier diodes showed that barrier height (Φ_{Bo}) and ideality factor (n) were strongly dependent on temperature. Schottky barrier heights for contacts of all the metals showed an increase with temperature between 300 K and 800 K. This was attributed to barrier inhomogeneities at the interface between the metal and the semiconductor, which resulted in a distribution of barrier heights at the interface. Ideality factors of Ni, Co and Pd decreased from 1.6 to 1.0 and for W the ideality factor decreased from 1.1 to 1.0 when the temperature was increased from 300 K to 800 K respectively. The device parameters were compared to assess advantages and disadvantages of the metals for envisaged applications.

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Key words: Silicon carbide, Metal-semiconductor, Schottky contacts, silicide, barrier height, ideality factor.

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