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DLTS and I-V-T characteristicsof e-beam deposited Pd/W 4H-SiC Schottky contacts

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Abstract content
   (Max 300 words)

DLTS investigations of 4H-SiC homo-epitaxial layers of doping density ˜ (10¹⁴ – 10¹⁶) cm⁻³ reveal the presence of two peaks below the conduction band, E_C, which we attribute to the e-beam metallization damage: at (E_C – 0.160) eV and at (E_C – 0.121) eV. These peaks were, however, not observed in 10¹⁶ cm⁻³ material. In addition, the well-known peaks at (E_C – 0.096) eV and at (E_C – 0.607) eV were present in all our samples in the doping range investigated. We observed departure from thermionic-emission (TE) theory in the I–V–T characteristics in the temperature range 30 K ≤ T ≤ 340 K, confirming the surface damage and indicative of an inhomogenous Schottky barrier at the W/SiC interface. Both the Schottky barrier height (ϕ_{BO}) and the diode ideality factor (n) exhibited anomalous behaviour: typically in 10¹⁶ cm⁻³ doped SiC, 1.50 eV ≤ ϕ_{BO} ≤ 0.89 eV and 1.10 ≤ n ≤ 4.60 were observed, respectively, with decreasing measurement temperature. The inhomogenous Schottky barrier was satisfactorily described by a Gaussian distribution with mean ϕ_{BO} = 1.30 eV and standard deviation σ₀ = 0.002 eV. Current conduction was predominantly TE for T > 100 K and was increasingly of a thermionic-field-emission (TFE) character for T < 100 K.

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Main supervisor (name and email)
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