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Mobility Models Based on Forward Current–voltage Characteristics of P-type Pseudo-vertical Diamond Schottky Barrier Diodes

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Supplementary Material

Figure S1 shows the forward current–voltage (I–V) characteristics of the p-type pseudo-vertical Schottky barrier diode (SBD) simulated using the analytic mobility model at 200, 300, 400, and 500 K. Figure S2 exhibits the two-dimensional electric field of the p-type diamond pseudo-vertical SBD simulated using the Lombard CVT mobility model. The anode voltage (V_a) and lattice temperature were 2 V and 300 K. Figure S3 is the forward I–V characteristics of the p-type diamond pseudo-vertical SBD simulated using the Lombardi CVT model at 200, 300, 400, and 500 K.

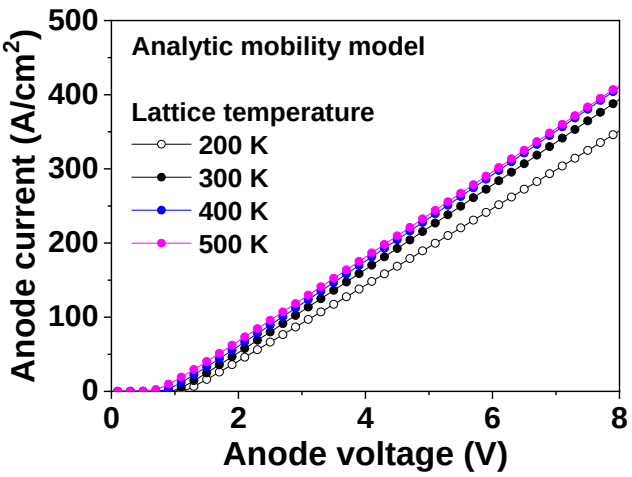


Figure S1. Forward current–voltage (I–V) characteristics of the p-type diamond pseudo-vertical Schottky barrier diode (SBD) simulated using the analytic mobility model at 200, 300, 400, and 500 K. The metal work function and hole saturation velocity were 5.65 eV and 2.7×10^7 cm/s respectively.

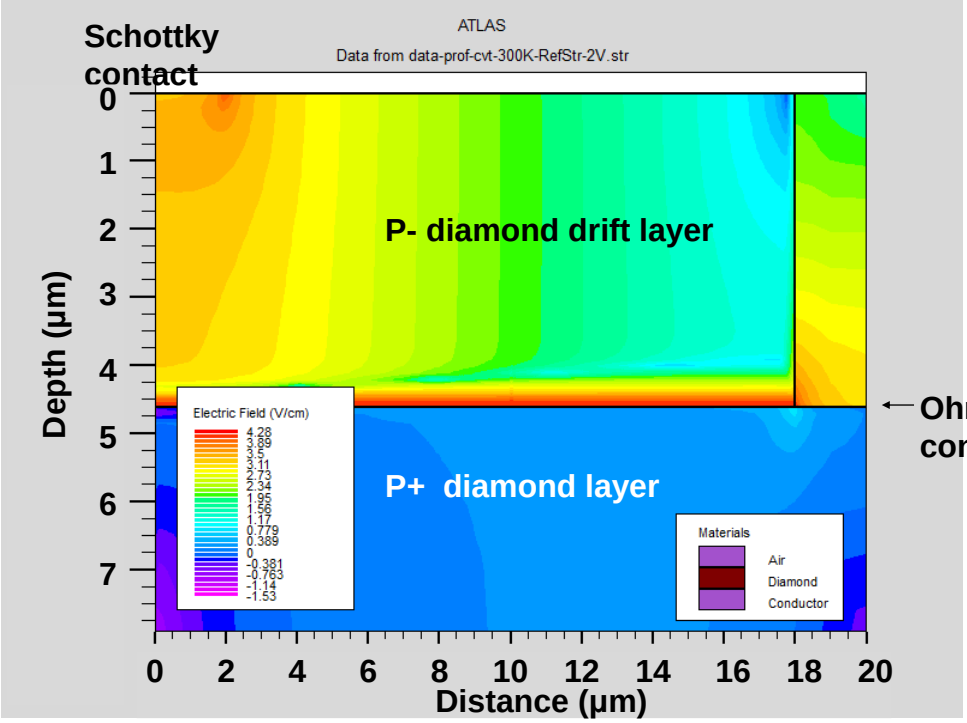


Figure S2. Two-dimensional electric field of the p-type diamond pseudo-vertical Schottky barrier diode (SBD) simulated using the Lombardi CVT mobility model. The metal work function, hole saturation velocity, lattice temperature, and anode voltage (V_a) were 5.65 eV, 2.7 × 10^7 cm/s, 300 K, and 2 V, respectively.

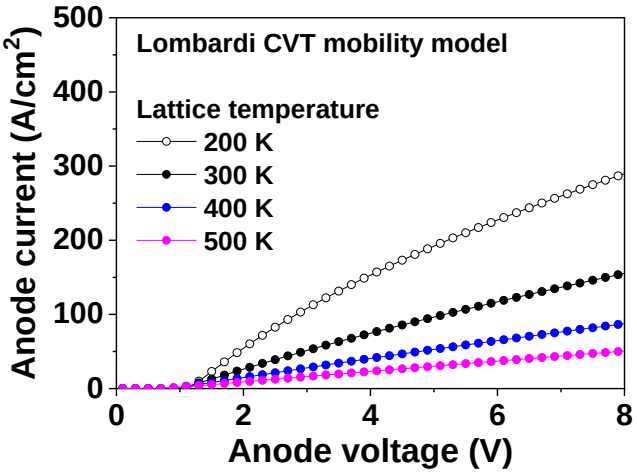
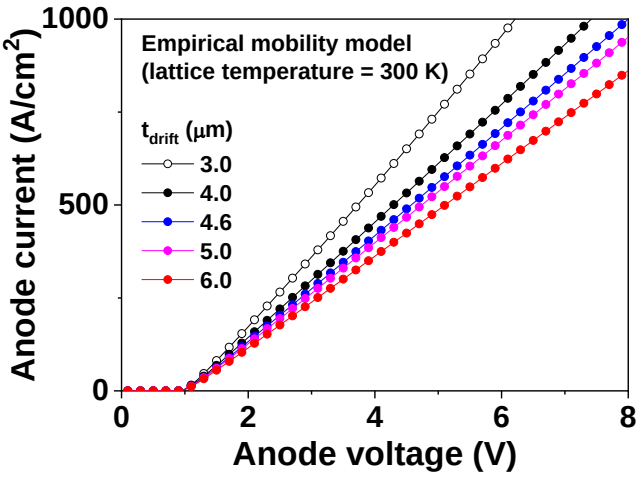


Figure S3. Forward current–voltage (I–V) characteristics of the p-type diamond pseudo-vertical Schottky barrier diode (SBD) simulated using the Lombardi CVT mobility model at 200, 300, 400, and 500 K. The metal work function and hole saturation velocity were 5.65 eV and 2.7 × 10^7 cm/s, respectively.

Figure S4 is the forward I–V characteristics of the p-type diamond pseudo-vertical SBDs simulated using the empirical mobility model at 300 K. The thickness of the P- drift layer (t_{drift}) were 3.0, 4.0, 4.6, 5.0, and 6.0 μm. Figure S5 shows the forward I–V characteristics of the p-type diamond pseudo-vertical SBDs simulated using the empirical mobility model at 300 K. The length of the cathode ($l_{cathode}$) were 0.5, 1.0, 2.0, and 3.0 μm.



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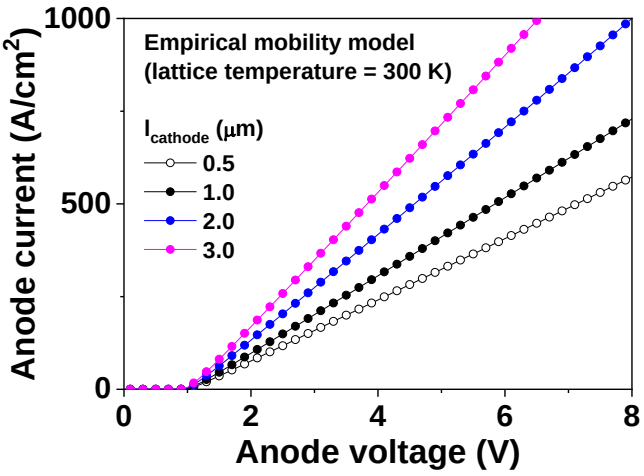
41 **Figure S4.** Forward current–voltage (I–V) characteristics of the p-type diamond pseudo-vertical
42 Schottky barrier diodes (SBDs) simulated using the empirical mobility model at 300 K. The values of
43 t_{drift} were 3.0, 4.0, 4.6, 5.0, and 6.0 μm, respectively. The metal work function, hole saturation
44 velocity, hole mobility, and β were 5.65 eV, 2.7×10^7 cm/s, 1,990 cm²/Vs, and 3.092, respectively.



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46 **Figure S5.** Forward current–voltage (I–V) characteristics of the p-type diamond pseudo-vertical
47 Schottky barrier diodes (SBDs) simulated using the empirical mobility model at 300 K. The values of
48 $l_{cathode}$ were 0.5, 1.0, 2.0, and 3.0 μm. The metal work function, hole saturation velocity, hole mobility,
49 and β were 5.65 eV, 2.7×10^7 cm/s, 1,990 cm²/Vs, and 3.092, respectively.

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