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Comparison of electrical properties of Schottky contacts on Si, Ge, SiC and AlGaN using sputtering, electron-beam and resistive evaporation

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Abstract content
   (Max 300 words)

RF sputtering, electron-beam evaporation as well as thermal evaporation was used to prepare Schottky contacts on Si, Ge, SiC and AlGaN. Metals used for evaporation include titanium, alluminium, niobium and tungsten. The electrical properties of the various contacts were investigated by using current-voltage (IV) and capacitance-voltage (CV) measurements. The IV results will be analysed to study the dominant current transport mechanisms and to obtain parameters such as the barrier height, series resistance and ideality factor. The CV measurements are used to determine the resulting free carrier concentration and its resulting depth distribution. The IV and CV measurements were also performed as a function of temperature in the range from 20 K – 350 K. This can then be used to determine the temperature dependance of the above semiconductor parameters including the Richardson's constant for the different metals used on the different semiconductor samples. The resulting metal contacts fabricated using the different evaporation techniques are then compared with each other in order to optimize the Schottky diode parameters.

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