



Contribution ID: 263

Type: **Poster Presentation**

High temperature carbon nanotubes (CNTs) based diode turn-on with a pulsed radio frequency signal

Friday, 8 July 2016 14:40 (20 minutes)

In this paper, a CNT diode was tested at elevated temperatures to be used in high temperature RFID sensor. The diode was made from CNTs that were grown on a silicon-substrate that made up the cathode and an anode was positioned at a set distance away from the CNTs. A voltage was applied to the diode at a voltage level just below the diode's turn on voltage. An external RF pulse is sent from an antenna. The diode receives the RF pulse and field emission from the CNT begins. The test system consists of a Radio Frequency Identification (RFID) tag (CNT diode), a transmitting (TX) antenna, and a receiving (RX) antenna. A square nanosecond pulsed signal is transmitted. The current and voltage data are captured for each temperature. The diode is tested at temperatures, ranging from room temperature to 300C, with 100C increments to see how the changes in operation with temperature.

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Session Classification: Poster 3-B

Track Classification: High Voltage Design, Devices, Testing, and Diagnostics