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Surface discharges generated at metal-semiconductor-gas triple junctions. DAVID PAI, DAVID BABONNEAU, SOPHIE CAMELIO, Institut PPRIME (CNRS UPR 3346, Universit de Poitiers, ISAE-ENSMA), SVEN STAUSS, KAZUO TERASHIMA, University of Tokyo — Discharges in air at atmospheric pressure as well as high-pressure CO_2 up to 15 atm are generated on silicon surfaces using reactor geometries typical of surface dielectric barrier discharges (DBDs), in order to investigate plasma generation and properties at metal-semiconductor-gas triple junctions. Short (10 ns) or long (200 ns) high-voltage pulses are applied at pulse repetition frequencies of 1 – 1000 Hz. Both p- and n-type silicon are investigated at different doping levels. Discharge generation can be achieved at applied voltages of about 1 kV or less, despite using silicon layers of 0.5 – 1 mm thickness. The discharge current differs in character from that of other types of nanosecond discharges, such as glows, sparks, and DBDs. The experimental characterization of plasma and surface properties is also presented.

David Pai
Institut PPRIME (CNRS UPR 3346, Universit de Poitiers, ISAE-ENSMA)

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