**Docket #:** S20-474

# Photoconductive Switch in Diamond

Use of diamond in high power and high temperature electronics is ideal due to its inherent properties, notably an ultra-high critical electric field of 10 MW/cm. Electronic devices require p-n junctions to achieve these electric fields, and thus n-doped diamond is required. Stanford researchers have designed a process and materials for phosphorous n-doped diamond that overcomes traditional processing limitations due to hydrogen passivation and co-doping. This new process from the Chowdhury group utilizes microwave plasma chemical vapor deposition to control doping levels with minimal undesired hydrogen to maintain high conductivity. Testing of these diamond photoconductive switches demonstrated a very high on:off ratio, and p-i-n diodes with 2kV and higher voltages.

**Stage of Research**

- Proof of concept

## Applications

- **Photoconductive switches**
- Grid-scale applications
- Ultra-wide band signals

## Advantages

- **Holds very high voltage and power**
- Maintains operation at high temperatures and in harsh environments

## Innovators

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