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DiamFab: electronic grade diamond epitaxial layers, not only for electronic!

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Power electronics are at the heart of our modern society, from every node of the energy distribution grid to your vehicles. Highest efficiency, reliability, and space-saving are required for such applications. Silicon has been widely used in power electronics but shows now its limitation to follow the trend imposed by the power electronics industry. Like so, wide bandgap semiconductors will gradually replace silicon. Among them, diamond, thanks to its superlative properties, is considered as the ultimate semiconductor.

As part of all the industrial processes needed to fabricate a diamond device, the epitaxial layer growth is one of the most critical since most of the electrical performances will depend on the quality of these active layers. Pushed by mechanical application and jewelry, substrates are commercially available and the device fabrication process relies on the traditional process. Conversely, the diamond epitaxy step is highly specific and requires strong experiences in diamond growth. By working on epitaxial diamond growth for more than 20 years, we have acquired unique know-how that allows DiamFab to grow diamond layers with overstanding features:

- accurate doping level and thickness
- wide range of boron doping level going from almost insulating material (10^{14} cm^{-3}) to metallic conduction diamond ($> 5 \times 10^{20} \text{ cm}^{-3}$)
- stack of different layers necessary to fabricate unipolar devices
- original doping profile also possible thanks to a well-controlled growth rate (delta doping for instance).

Electronic applications such as diodes and transistors manufacturing are extremely demanding from a material point of view. Moreover, our electronic grade diamond layers are highly suitable for other applications such as high energy detectors and others.

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