

## **Development of CVD Diamond Radiation Detectors**

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### **Abstract**

Chemical vapour deposition (CVD) diamond is a very interesting material for the fabrication of radiation detectors, particularly for X-ray dosimetry. CVD diamond could potentially be used for large-area X-ray sensors, it is extremely radiation hard, can withstand high temperatures and highly corrosive environments, and is also "tissue-equivalent" in regard to X-ray absorption. In fact, there exist several applications where other standard semiconductor detectors do not fulfil those specific requirements. In this work we report on the fabrication and characterisation of CVD diamond radiation detectors and we describe how this material, even though of a polycrystalline nature, is readily of great interest for applications as a solid state X-ray dosimeter and alpha particle sensor. We have characterised the detectors using I-V measurements, photocurrent response to 30 KV(peak) X-ray pulses and their response to  $^{241}\text{Am}$  alpha particles. Ion beam induced current (IBIC) studies have also been used to investigate charge transport within single diamond crystallites. Ion implanted ohmic contacts have also been developed using boron to graphitise the diamond surface and produce high-quality non- metalised ohmic contacts.