Polycrystalline CVD Diamond-Based Structures for Detection of Charge Particles

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Abstract. In this work, the radiation detector structures based on polycrystalline diamond film have been studied. Polycrystalline chemical vapor deposited diamond film on silicon substrate has a thickness of about 3 μm. The Ti/Au double layer was used to prepare the circular electrical contacts of 1 mm in diameter on the top of diamond layer. The back side was covered by the full area contact. The current-voltage characteristics of the prepared samples in both directions were measured at room temperature up to 50 V with the flowing current below 0.1 nA. The samples were then connected to the spectrometric chain and used for α-particle detection generated from ^{241}Am. The range of α-particles in detector structure is 27 μm. The detectors were operated at zero bias and show a relative energy resolution of 12% for α-particles with energy of 5.5 MeV.