Silicon carbide is a semiconductor with a wide bandgap of up to 3.2 eV and is capable of operating in extreme conditions, high temperature and high energy modes. This work focuses on the investigation of electrical and optical properties of monocrystalline SiC by various methods including Raman spectroscopy, volt-ampere characteristics, L-TCT and spectroscopic techniques. The adhesion of contacts and the influence of different contact materials on the ability to detect ionizing radiation are also studied to optimize the technology of preparation of quality SiC-based radiation detectors.