

The Processing Parameters and Operating Characteristics of Thin Film Diamond Electronic Devices

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ABSTRACT

Diamond possesses a unique combination of properties making it a promising candidate for high-temperature and high power electronic device applications. The feasibility of using diamond for high-temperature device applications has been questioned because of the possible degradation of materials properties at high temperatures. However, emerging electronic device applications of diamond thin films demand a better understanding of their electronic properties. In this research, 2 major tasks are thus included : (1).Characterization of the electronic,structural and urfaceproperties of diamond thin films. (2).Characterization of the operating characteristics of diamond electronic device. In this study diamond thin films are deposited by microwave plasma-assisted chemical vapor deposition. Metal contacts are subsequently deposited to fabricate both ohmic and Schottky barrier structures. These metal/diamond structures are characterized to study the properties of diamond films and their Schottky barrier structures. Subsequent electronic characterization of these Schottky barrier structures are carried out at elevated temperatures to confirm the integrity of their operating characteristics at high temperatures.

Keywords : diamond

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