

THESIS TITLE	THE STUDY AND DEVELOPMENT OF DIAMOND THIN FILM HETEROJUNCTION DIODE
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YEAR	1997

### ABSTRACT

This thesis presents the study and development on P-type diamond film to heterojunction semiconductor diode device. The study on P-type diamond film synthesis was initiated by low pressure thermal CVD method, which is very fascinating both in research and in commerce not only the most inexpensive fabrication apparatus, low operation cost, high level of safety, and also pure synthesized diamond. Furthermore, diamond thin films, however, are fabricated on nondiamond substrates in the manner of cost-saving utilization and make more opportunities for potential applications in comparison with conventional synthesis using high pressure and high temperature bulk diamond process, which can unlikely make use of diamond efficiently. In addition, the thesis also presents and study on film morphologies from SEM. For structures and properties of film, it was studied respectively from patterns of X-ray diffraction and Raman spectroscopy, determination of conductivity type of film by Hot-point probe, study on the atmosphere component gas effect on the conductive diamond thin film formation, finally, the applications of diamond film for electronics by the fabrication to Schottky diode device, the development of heterojunction diode between p-type diamond film and n-type silicon which can be operated at high temperature, and study on the electrical property of prepared devices. The experimental results of the fabricated diode analyzed and explained by the aid of the proposed energy band model.