Epitaxial Nucleation and Growth of Diamond Films on Silicon

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1. Introduction

To investigate the nucleation and growth of diamond on silicon, a high-pressure, high-temperature (HPHT) method was employed. The method involves the deposition of diamond at high pressures and temperatures using a hot-pressed diamond substrate. This method allows for the control of the growth conditions and the formation of epitaxial diamond films.

2. Experimental

The experimental setup consists of a high-pressure, high-temperature chamber and a diamond-anvil cell. The diamond films were grown by applying high pressure and temperature to the substrate. The growth process was monitored using transmission electron microscopy (TEM).

3. Results

The results show that the diamond films grown on silicon have a well-defined epitaxial structure. The TEM images reveal the growth of diamond crystals on the silicon substrate. The Raman spectra confirm the diamond phase.

4. Conclusions

The growth of diamond on silicon using the HPHT method results in epitaxial diamond films. These films have a well-defined structure and exhibit high quality. The results are significant for potential applications in electronic devices and other high-technology fields.

5. Publications