

Department of Physics, Chemistry and Biology

Master's Thesis

Optical properties of cubic silicon carbide

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Linköping, January 1, 2015

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1

Introduction

This thesis describes the growth and optical characterization of cubic silicon carbide (*SiC*). SiC has attracted academic interest since the 19:th century, when it was first fabricated and used as an abrasive [1]. SiC has been found to be a very stable material. It exhibits a high chemical inertness [2], and is currently commonly used in high power and high temperature applications due to its ability to survive in such environments.

SiC is a material which exists in a large number of different polytypes, the most common of which are hexagonal, cubic and rhombohedral. The work described in this thesis deals with the only cubic polytype, denoted *3C*. This is one of the structurally most simple polytypes. Compared to the hexagonal counterparts *4H* and *6H*, the *3C* polytype has for a long time been difficult to fabricate in good quality single crystal form, and is therefore less studied than the hexagonal types.

2

Growth techniques

This chapter describes the growth technique.

3

Characterization techniques

This chapter will describe the different characterization techniques.

3.1 Absorption measurements

Here will follow a description of how the absorption measurements were done.

4

Experimental setup

Here the setups for the various experiments will be described.

5

Results

This chapter describes the results obtained from the experiments.

6

Discussion

In this chapter I will discuss the results of the work.

7

Conclusion

The conclusions drawn from this work are described here.

8

Future work

In this chapter I will write some of my thought of what is to be done in the future concerning these topics.

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