

**TITLE**

by

**Kraig Andrews**

Ph.D. Disseration Prospectus

YEAR

\_\_\_\_\_  
Advisor

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**ABSTRACT**

**TITLE HERE**

by

**Kraig J. Andrews**

August 2008

Advisor: Dr. Zhixain Zhou  
Major: Physics  
Degree: Doctor of Philosophy

Abstract here

# Table of Contents

|   |          |
|---|----------|
| List of Figures . . . . .   | iii      |
| List of Tables . . . . .  | iv       |
| <b>1 Introduction</b>   | <b>1</b> |
| 1.1 The Conception of Semiconductors . . . . .                      | 1        |
| 1.2 Evolution of Semiconductors . . . . .                           | 2        |
| 1.3 Interest and Development of Two-dimensional Materials . . . . . | 2        |
| 1.4 Current State of Two-dimensional Materials . . . . .            | 2        |
| <b>2 Chapter 2</b>  | <b>3</b> |
| 2.1 Section Heading . . . . .                                       | 3        |
| <b>3 Chapter 3</b>  | <b>4</b> |
| 3.1 Section Heading . . . . .                                       | 4        |
| <b>4 Conclusion</b>   | <b>5</b> |
| 4.1 Heading . . . . .   | 5        |

# List of Figures

|     |                        |   |
|-----|------------------------|---|
| 1.1 | Name . . . . .         | 1 |
| 1.2 | name . . . . .         | 1 |
| 1.3 | main caption . . . . . | 2 |

# List of Tables

|     |   |   |
|-----|---|---|
| 1.1 | Properties of selected semiconductors . . . . . | 1 |
|-----|---|---|

# Chapter 1

## Introduction

### 1.1 The Conception of Semiconductors

Here we present work by [2, 1].

| Semiconductor | Band Gap<br>(eV) | Electron Mobility <sup>1</sup><br>(cm <sup>2</sup> /V · s) | Hole Mobility <sup>1</sup><br>(cm <sup>2</sup> /V · s) | Lattice Constant<br>(Å) |
|---------------|------------------|--|--|-------------------------|
| Si            | 1.12             | 1,500  | 470  | 5.43095 <sup>a</sup>    |
| Ge            | 0.67             | 3,900  | 1,900  | 5.64613 <sup>a</sup>    |
| GaAs          | 1.42             | 8,500  | 400  | 5.6533 <sup>b</sup>     |
| CdS           | 2.5              | 300  | 50   | 5.8320 <sup>c</sup>     |
| AlAs          | 2.16             | 1,200  | 400  | 5.6622 <sup>b</sup>     |
| ZnS           | 3.66             | 165  | 5  | 5.410 <sup>d</sup>      |

Table 1.1: Selected properties of some common semiconductors at  $T = 300$  K. Adapted from ref. [5].

<sup>1</sup> Drift mobilities in the purest materials.  
<sup>a</sup> Diamond cubic crystal structure [4].  
<sup>b</sup> Zinc blende crystal structure [3].  
<sup>c</sup> Hexagonal and cubic... citation needed.  
<sup>d</sup> Notes on ZnS structure.

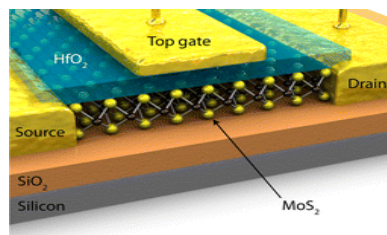


Figure 1.1: Name

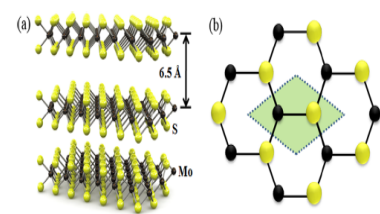


Figure 1.2: name

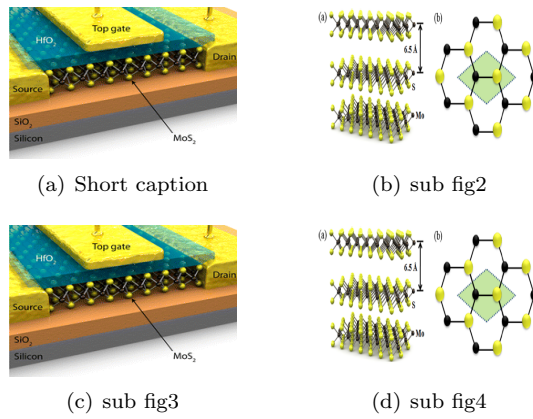


Figure 1.3: main caption

## 1.2 Evolution of Semiconductors

## 1.3 Interest and Development of Two-dimensional Materials

## 1.4 Current State of Two-dimensional Materials

## Chapter 2

# Chapter 2

### 2.1 Section Heading



## Chapter 3

# Chapter 3

### 3.1 Section Heading

## Chapter 4

# Conclusion

### 4.1 Heading

# Bibliography

- [1] J. W. Allen. Gallium Arsenide as a Semi-insulator. *Nature*, 187:403–405, jul 1960.
- [2] M. Cutler and N. F. Mott. Observation of Anderson Localization in an Electron Gas. *Physical Review*, 181:1336–1340, may 1969.
- [3] A. Ledwith and S. J. Moss. *Chemistry of the Semiconductor Industry*. Springer Science, New York, NY, 1 edition, 1989.
- [4] W.C. O'Mara, R.B. Herring, and L.P. Hunt. *Handbook of Semiconductor Silicon Technology*. Materials science and process technology series. Noyes Publications, 1990.
- [5] Dieter K. Schroder. *Semiconductor Material and Device Characterization*. John Wiley and Sons, Inc., Hoboken, New Jersey, 3rd edition, 2006.