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by

Kraig Andrews

Ph.D. Disseration Prospectus

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ABSTRACT

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Degree: Doctor of Philosophy

Abstract here

ACKNOWLEDGEMENTS

Acknowledgements here...

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Chapter 1

Introduction

1.1 The Conception of Semiconductors

Here we present work by [2, 1].

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

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

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

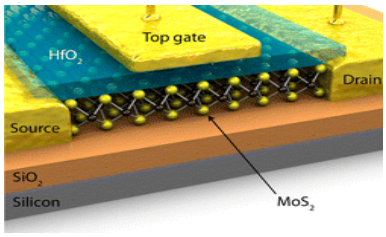


Figure 1.1: Name

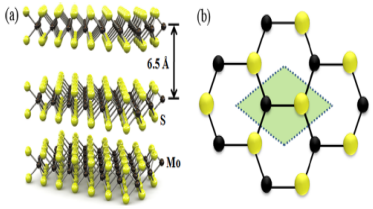


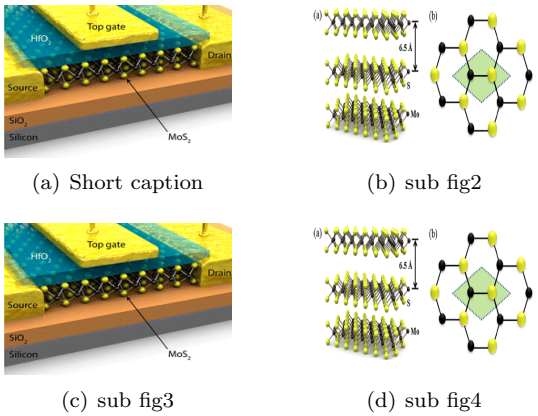
Figure 1.2: name

Testing macros... $140\,\mathrm{cm^{-2}V^{-1}s^{-1}}$, hBN, K, $\mathrm{m\,s^2}$

2D material	theoretical E_g (eV)	experimental E_g (eV)
graphene	0	0
bilayer graphene	0	0
bulk h-BN		5.97
monolayer h-BN		6.07
few layer (2-5) h-BN		5.92
bulk MoS_2	1.2[a]	1.0-1.29[a]
monolayer MoS_2	$\sim$ 1.90[b]	$\sim$ 1.90[b]
bulk WS_2	$\sim$ 1.30[a]	$\sim$ 1.35[a]
monolayer WS_2	$\sim$ 2.10[b]	

Table 1.2: Summary of the band gaps of typical monolayer, bilayer, and bulk TMDs and h-BN materials. Table adapted from ref. [6].

[a] Indirect band gap semiconductor.
[b] Direct band gap semiconductor.



(a) Short caption (b) sub fig2

(c) sub fig3 (d) sub fig4

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

Experimental Details

2.1 Nano-device Fabrication

2.1.1 Subsect 1

Chapter 3

Results and Discussion of Experiment

3.1 Section Heading

Chapter 4

Future Works and Conclusion

4.1 Heading

4.2 Limitations

Bibliography

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[6] Mingsheng Xu, Tao Liang, Minmin Shi, and Hongzheng Chen. Graphene-like two-dimensional materials. *Chemical Reviews*, 113(5):3766–3798, 2013. PMID: 23286380.

Appendices

Appendix A

Acronyms