

CONTENTS

List of Figures and Tables	[i-v]
Preface	[vi-viii]
Chapter 1: Introduction	[1-43]
1.1 Introduction	
1.1.1 Mott-Insulator	
1.1.2 Geometrically Frustration in AV_2O_4	
1.1.3 AV_2O_4 systems	
1.1.3.1 ZnV_2O_4	
1.1.3.2 MnV_2O_4	
1.2 Theoretical Background	
1.2.1 Spinel Oxide	
1.2.2 Crystal Field Theory	
1.2.3 The Jahn-Teller Theorem	
1.2.3.1 Jahn-Teller Distortion	
1.2.4 Magnetism	
1.2.3.1. Frustrated Magnetism	
1.2.3.2. Superexchange	
1.2.4 Magneto caloric effect	
1.2.5 Transport Properties	
1.2.5.1 Variable Range Hopping	
1.2.5.2: Arrhenius law	
1.2.6 The Modified Arrott Plot	
Reference	
Chapter 2: Experimental: Synthesis Procedure and Characterization Details	[44-65]
2.1: Sample Synthesis	
2.2: Experimental Tools & Their Working Principle	
2.2.1: X-ray Diffraction	
2.2.2: Neutron Diffraction	
2.2.3: Superconducting Quantum Interference Device	
2.2.4: Transmission electron microscopy	

2.2.5: X-ray absorption fine structure (XAFS) spectroscopy

2.2.6: Fourier transform infrared (FT-IR) spectroscopy

2.2.7: Resistivity Measurement

2.2.8: X-ray Photoemission Spectroscopy

2.2.9: Thermoelectric Measurement

2.2.10: AC Susceptibility

References

Chapter 3: Transport, magnetic and structural properties of Mott insulator MnV_2O_4 at the boundary between localized and itinerant electron limit [66-84]

3.1: Introduction

3.2: Experimental

3.3: Results and Discussion

3.3.1: Magnetic Property

3.3.2: Structural Analysis

3.3.3: Transport Properties

3.4: Conclusions

References

Chapter 4: Effect of Zn doping on the magneto-caloric effect and critical constants of Mott insulator MnV_2O_4 [85-101]

4.1: Introduction

4.2: Experimental

4.3: Results and Discussion

4.3.1: Structural Analysis

4.3.1.1: X-ray diffraction

4.3.1.2: XANES measurements

4.3.2: Magnetic property

4.3.2.1: Critical behavior

4.3.2.2: Magneto caloric effect

4.2: Conclusions

References

Chapter 5: Chemical Pressure effect at the boundary of Mott insulator and itinerant electron limit of Spinel Vanadates [102-125]

- 5.1: Introduction
- 5.2: Experimental
- 5.3: Results and Discussion
- 5.4: Conclusions

References

Chapter 6: Effect of dilution of both A- and B- sites on the multiferroic properties of spinel Mott insulators [126-139]

- 6.1: Introduction
- 6.2: Experimental
- 6.3: Results and Discussion
 - 6.3.1: Structural analysis
 - 6.3.2: Magnetic property
 - 6.3.3: Ferroelectric property
 - 6.3.4: Transport property
- 6.4: Conclusions

References

Conclusion of the Thesis [140-141]

List of publications

Copies of the reprints of published papers

Personal profile