

Master thesis

修士論文

Title

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Abstract

The magneto electric effect has been attracted much attention. The ME effect is . The ME effect can be However can not used due to its smallness and temperature.

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Chapter 1

Introduction

1.1 Citation and Chemical Formula

Citation [?] Chemical Formula Cr_2O_3

Chapter 2

Method

To elucidate the microscopic mechanism of the ME effect, an effective model

2.1 Equation

2.1.1 Equation

equation

$$E_{\text{total}}(u_m, e_i) = E_0 + E_{\text{phonon}}(u_m) + E_{\text{spin}}(u_m, e_i). \quad (2.1)$$

2.2 Figure

2.2.1 Figure

FIGURE

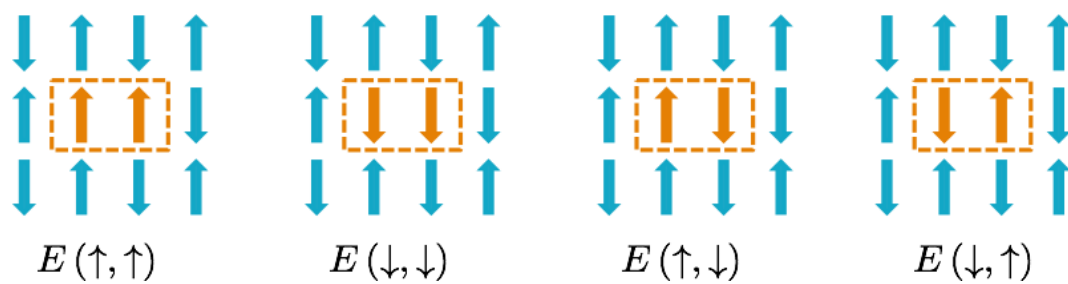


Figure2.1: The four different spin configurations

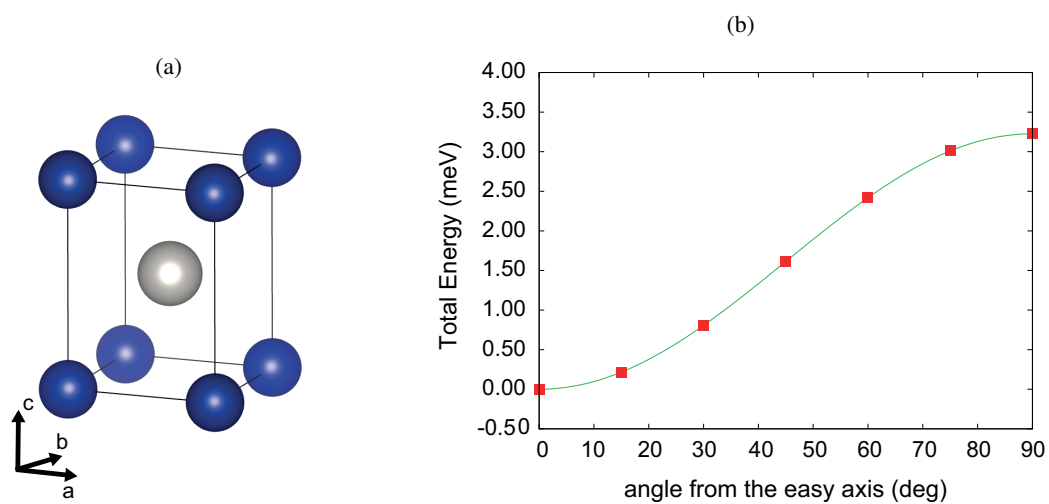


Figure2.2: (a) The unit cell of CoPt. (b) Magnetic anisotropic energy of CoPt.

Chapter 3

Results

For Cr_2O_3 we determine the parameters of the effective Heisenberg model introduced in Chapter.2

3.1 Table

3.1.1 Table

Chapter reference Fig2.2.

	A_{2u} modes		E_u modes			
LDA+U (this work)	407	574	311	447	562	635
PBE (Ref. [?])	388	522	297	427	510	610
Expt. (Ref. [?])	402	533	305	440	538	609

Table3.1: Phonon frequencies (cm^{-1})

Chapter 4

Conclusion

mettya nice na conclusion

Appendix A

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Acknowledgements

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