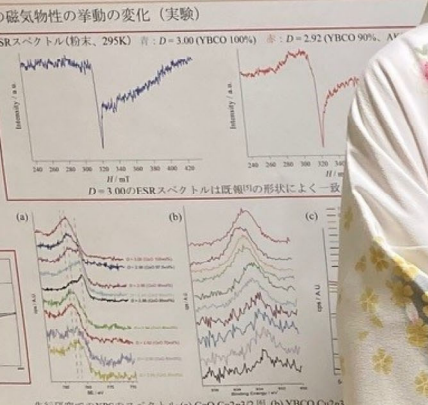
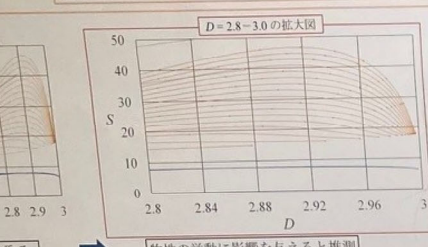
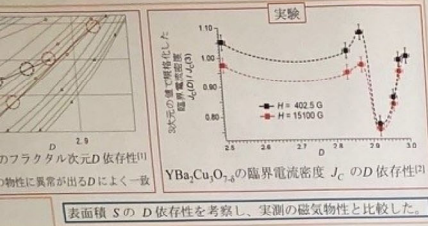
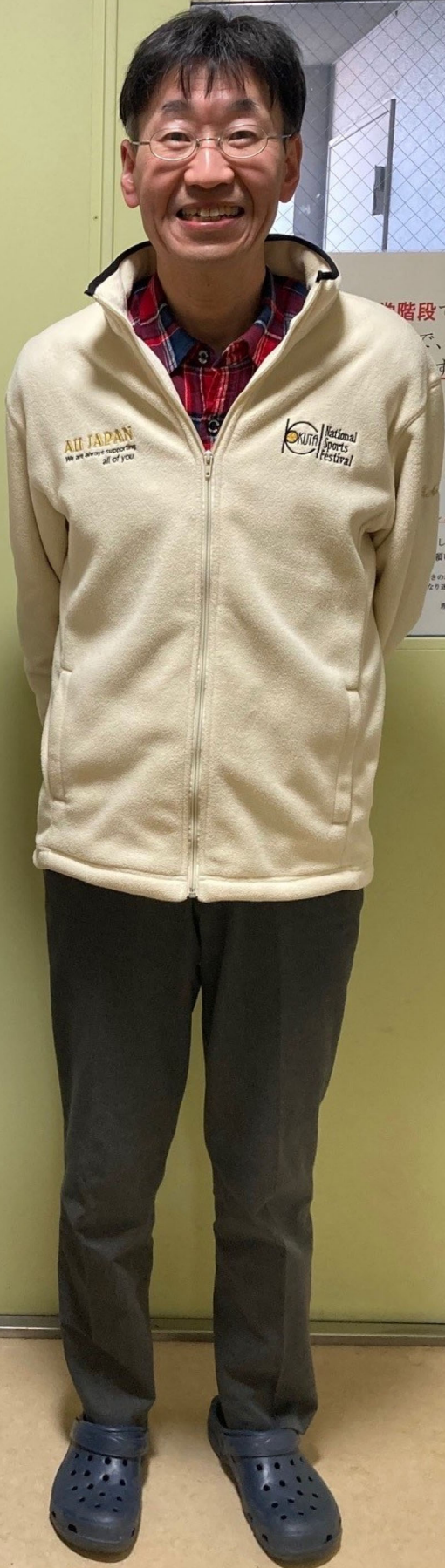


物質の形状と電子物性に関する考察

(一) ○福田喜章、内藤俊雄

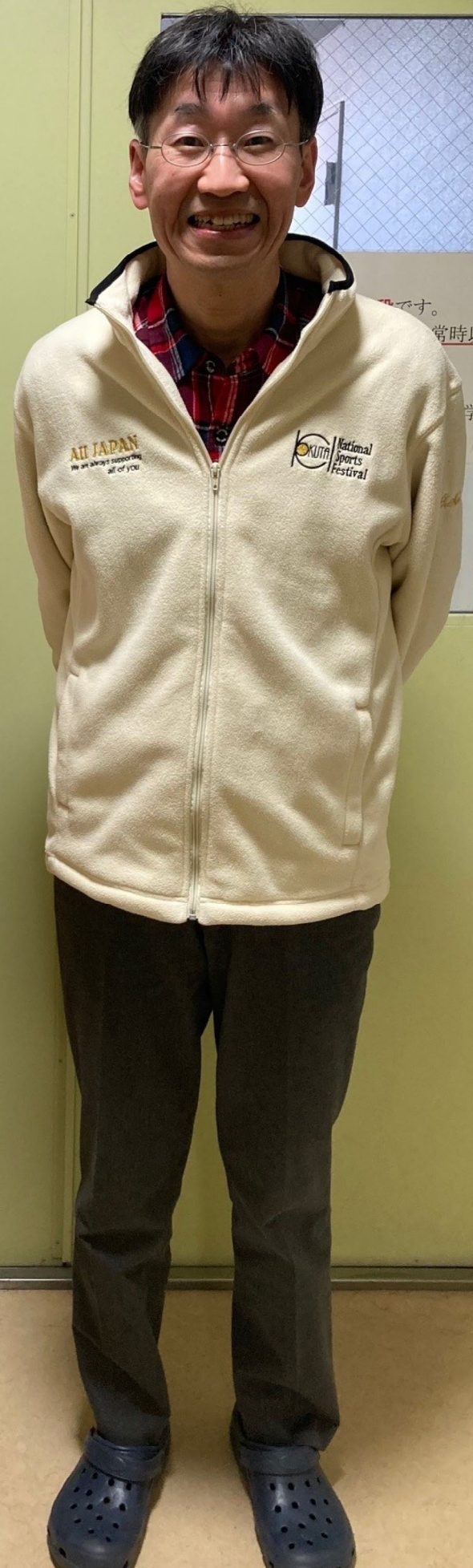
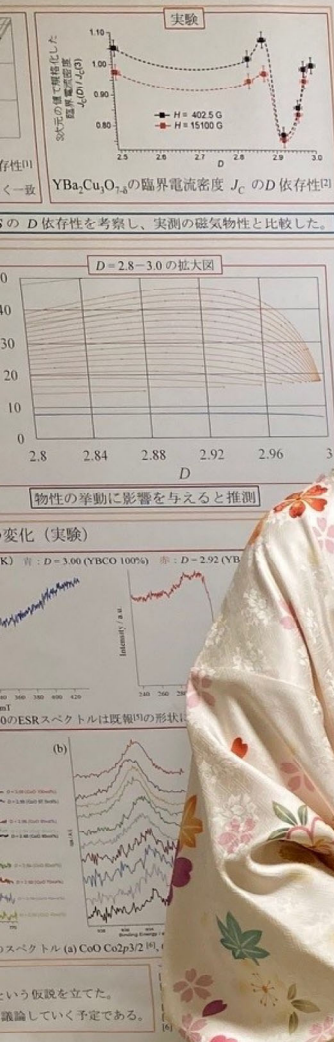


先行研究でのXPSのスペクトル (a) CoO Co₂p_{3/2}⁽³⁾, (b) YBCO Cu₂p_{3/2}
References:
(1) 福田, 内藤 2017年
(2) T. Naito, et al., Adv. Phys. 56, 1 (2017)
(3) A. Maitani, et al., J. Phys. Chem. C 117, 11111 (2013)
(4) D. Yamamoto, et al., Phys. Rev. B 78, 014407 (2008)
(5) S. Yamada, et al., Phys. Rev. B 78, 014408 (2008)
(6) T. Naito, et al., Eur. Phys. J. B 2017, 1-10



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理学部長
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理学部総務チーム

電子物性に関する考察
章、内藤俊雄



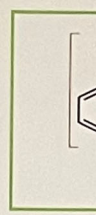
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学部長

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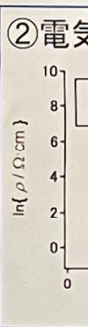
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Vibrational spectra of $[M(dmit)_2]_x$ salts

○ Koh Takasugi¹, Takashi Yamamoto^{1,2}, Toshio Naito¹, Reizo Kato²

¹ Graduate School of Science and Engineering, Ehime University ² RIKEN



Introduction

For lattices of $X[M(dmit)_2]$ [$X =$ a monovalent cation, $M = Pd$ or Pt], a considerable increase from the viewpoint of charge-ordering (CO) due to orbital degree of freedom. We report results of COs in various ground states.

Conclusion

$Q[Pd(dmit)_2]$: Metallic state is ascribed to the dynamical fluctuation due to competition between octamers and tetramers.
 $Me_4N[Pd(dmit)_2]$: Intra-dimer and intra-molecular charge separation.
 $Me_4P[Pd(dmit)_2]$: AF state shows charge disproportionation due to intra-dimer and intra-molecular charge separations.

Model compounds

X^+ a monovalent cation
 $M = Pd$ or Pt

HOMO-LUMO inversion and charge ordered (CO) states

Mechanisms of CO states

Various charge distributions

Various ground states in 2D triangular lattices (asymmetrical)

- Antiferromagnetic (AF) insulator
- Charge ordered (CO) insulator
- Spin liquid (SL)
- Metal (M)
- Superconductor (SC)

Experiments

IR spectroscopy

Raman spectroscopy

Correlation diagram in dimers and tetramers (asymmetric molecule)

Q[Pd(dmit)₂] (Q-salt) Intra- and inter-dimer COs

Raman spectra

References

We thank Dr. Masahiro Uchida (RIKEN, Japan) for experimental help.
This work was partly supported by Nanotechnology Platform Program (Molecular and Material Synthesis) of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.

内藤研究室

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学生研究





Vibrational spectra of $[M(\text{dmit})_2]$ salts

○ Koh Takasugi¹, Takashi Yamamoto^{1,2}, Toshio Naito¹, Reizo Kato²
 1: Graduate School of Science and Engineering, Ehime University 2: RIKEN



Introduction
 2D triangular lattices of $[M(\text{dmit})_2]$ ($X = \text{a monovalent cation, } M = \text{Pd or Pt}$) salts are of considerable interest from the viewpoint of charge-disproportionation (CD) due to orbital degree of freedom. We report mechanisms of CDs in various ground states.

Conclusion
 $Q(\text{Pd}(\text{dmit})_2)$: Metallic state is ascribed to the dynamical fluctuation of octamers to competition between octamers and tetramers.
 $\text{Me}_4\text{N}(\text{Pt}(\text{dmit})_2)$: Inter-dimer and intra-molecular charge separation.
 $\text{Me}_4\text{N}(\text{Pd}(\text{dmit})_2)$: AF state shows charge disproportionation due to inter-dimer and intra-molecular charge separations.

Background

Our motivation
 Multifunctional materials due to coexistence of low-dimensional systems
 Metal dithiolene complexes
 TTP derivatives

Model compounds
 X^+ a monovalent cation
 M : Pd or Pt

HOMO-LUMO inversion and charge ordered (CO) states (CP)
 Energy dispersion of orbitals and tight dimers
 Mechanisms of CO states
 Various charge distributions

Various ground states in 2D triangular lattices (structural)
 Antiferromagnetic (AF) insulator
 Charge ordered (CO) insulator
 Spin liquid (SL)
 Metal (M)
 Superconductor (SC)

Experiments
 Electron spectroscopy
 IR spectroscopy
 Raman spectroscopy

Results and Discussion

Correlation diagram of C-C stretching modes in dimers, tetramers and octamers (symmetric molecule) (I)

Correlation diagram in dimers and tetramers (II)

$Q(\text{Pd}(\text{dmit})_2)$ (O-salt) Intra- and inter-dimer CDs
 Raman spectra
 C-C stretching modes below T_{CD} (≈ 40 K) indicate the static phase separation
 Octamers and Tetramers
 Assignments of peaks 1-2
 Heterogeneous charge of O-salt

Acknowledgements
 We thank Dr. Akira Uchida (RIKEN, Japan) for experimental setup.
 This work was partly supported by Nanotechnology Platform Program (Substrate and Material Synthesis) of the Ministry of Education, Culture, Science and Technology (MEXT), Japan.

学位記
 愛媛大学

