

Development of Integrated Multinuclear Transition Metal Complexes with Novel Properties

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1997 Fiscal Year Final Research Report Summary

Development of Integrated Multinuclear Transition Metal Complexes with Novel Properties

Research Project

Project/Area Number

08640707

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Inorganic chemistry

Research Institution

Faculty of Science, Kanazawa University

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1996 – 1997

Keywords

Dinuclear Cobalt Complexes / Dinuclear Iron Complexes / Dinuclear Nickel Complexes / Tetranuclear Iron Complexes / Molecular Oxygen Complexes / Dinuclear Zink Complexes / Magnetic Interaction

Research Abstract

(1) Development of Novel Dinuclear Iron (II) and Cobalt (II) Complexes Which Can Reversibly Add Molecular Oxygen as a Model of Iron Protein : We succeeded in preparing the first dinuclear iron complex $[\text{Fe}_2(\text{Ph-bimp})(\text{C}_6\text{H}_5\text{COO})(\text{O}_2)]^{2+}$ which can reversibly add molecular oxygen. The complex was noticed worldwide. Di- μ -superoxo dinuclear cobalt complex $[(\text{Me}_3\text{tacn})_2\text{CO}^{3+}(\mu\text{-OH})(\mu\text{-O}_2)]^{3+}$ was newly prepared, which is characteristic in that it contains two bridging superoxo groups.

(2) Preparation of Copper (I) Complexes Which Can Absorb Oxygen and Catalytically Oxidizing Abilities Thereof : $[\text{Cu}(\text{N}_4\text{-Me}_3\text{py})]^+$ was reacted with molecular oxygen, and the a CH_3 - group of the ligand was oxidized to $-\text{COOH}$. $[\text{Cr}(\text{H}_2\text{O})(\text{tpa})]^+$ was found to be a good catalyst for reducing NO_2 to N_2O .

(3) Preparation of Dinuclear Chromium (III,III) -, Dinuclear Chromium (III) -Nickel (II) -, and Trinuclear Nickel (II,II) -Chromium (O) Complexes ; Metal-Metal Superexchange Interaction, and Development of Molecular Magnets : $[(\text{phen})_2\text{Cr}(\text{OH})_2\text{Ni}(\text{L}_2)]^{3+}$ (L_2 : 2,2,2-tet, 3,2,3-tet, cyclen, tpa, Me-tpa, and Me₂-tpa) were synthesized, and investigated the magnetic interaction between nickel (II) and chromium (III) ions. In the present stage, we could not prepare an ideal molecular magnet. However, the results here will be a good direction for developing a molecular magnet.


(4) Preparation of Nickel (II) Complexes as Model of Urease : $[\text{Ni}_2(\text{Me}_4\text{-tpdp})(\text{CH}_3\text{COO})(\text{ClO}_4)(\text{CH}_3\text{OH})]^+$ and $[\text{Ni}_2(\text{Me}_4\text{-tpdp})(\text{CH}_3\text{COO})(\text{urea})]^{2+}$ were newly prepared and the structure was analyzed. The complexes will be a good model of urease.


(5) Development of Dinuclear Zinc (II,II) complexes as a Model of Phosphoesterase : $[\text{Zn}_2(\text{Me}_4\text{-tpdp})(\text{HOCO})]^{2+}$, $[\text{Zn}_2(\text{Me}_4\text{-tpdp})(\text{CH}_3\text{OCOO})]^{2+}$, $[\text{Zn}_2(\text{Me}_4\text{-tpdp})(\text{OH}_2)]^{3+}$, and $[\text{Zn}_2(\text{Me}_4\text{-tpdp})(\text{OH}_2)]^{2+}$ were newly prepared, which will be a good model of phosphatase.


Research Products (16 results)


All Other


All Publications (16 results)


[Publications] T.Ookubo, H.Sugimoto, T.Nagayama, H.Masuda, T.Sato, K.Tanaka, Y.Maeda, H.Ohokawa, Y.Hayashi, A.Uehara, & M.Suzuki: "Cis-1,2- μ -Peroxo Diiron Complex : Structure and Reversible Oxygenation" J.Am.Chem.Soc.118.3. 701-702 (1996) 


[Publications] T.Kayatani, Y.Hayashi, M.Suzuki, K.Inomata, & A.Uehara: "Coordination Asymmetry of a Dinuclear Copper (II) Complex : Synthesis, Structure, and Magnetism" Bull.Chem.Soc.Jpn.69.2. 389-397 (1996) 


[Publications] H.Sugimoto, Y.Hayashi, C.Koshi, S.Fujinami, M.Suzuki, Y.Maeda, & A.Uehara: "Formation of a Tetranuclear High-Spin Iron (II,III,II,III) Mixed Valence Complex" Chem.Lett.1996 · 10. 933-934 (1996) 


[Publications] K.Yamaguchi, S.Koshino, M.Suzuki, A.Uehara, & S.Suzuki: "Structures and Catalytic Activities of Carboxylate-bridged Dinickel (II) Complexes as Models for the Metal Center of Urease" J.Am.Chem.Soc.119 · 24. 5752-5753 (1997) 


[Publications] H.Hayashi, S.Fujinami, M.Suzuki, K.Tanaka, & A. Uehara: "Dioxygen-Reactivity of a Copper (I) Complex with Tris (6-methyl-2-pyridylmethyl) amine" J.Inorg.Biochem.67 · 1~4. 66- (1997) 


[Publications] Y.Hayashi, M.Obata, M.Suzuki, & A.Uehara: "Synthesis and Properties of Di- μ -superoxo Dinuclear Cobalt (II,III) Complex" Chem.Lett.1997 · 12. 1255-1256 (1997) 

[Publications] N.Kmeda, H.Nagao, Y.Kushi, G.Adachi, M.Suzuki, A.Uehara, and K.Tanaka: "Molecular Structure of Nitro- and Nitrito-Copper Complexes as Reaction Intermediates in Electro-chemical Reduction of Nitrite to Dinitrogen Oxide" Bull.Chem.Soc.Jpn.68, No.2. 581-589 (1995) 

[Publications] Y.Hayashi, T.Kayatani, H.Sugimoto, M.Suzuki, K.Inomata, A.Uehara, Y.Mizutani, T.Kitagawa, and Y.Maeda: "Synthesis, Characterization, and Reversible Oxygenation of μ -Alkoxo diiron (II) Complexes with a Dinucleating Ligand, N,N,N', N'-Tetrakis {2-(6-methylpyridyl) methyl} -1,3-diaminopropane-2-olate" J.Am.Chem.Soc.117, No.45. 11220-11229 (1995) 

[Publications] T.Ookubo, H.Sugimoto, T.Nagayama, H.Masuda, T.Sato, K.Tanaka, Y.Maeda, H.Ohokawa, Y.Hayashi, A.Uehara, and M.Suzuki: "Cis-1,2- μ -Peroxo Diiron Complex : Structure and Reversible Oxygenation." J.Am.Chem.Soc.118, No.3. 701-702 (1996) 

[Publications] T.Kayatani, Y.Hayashi, M.Suzuki, K.Inomata, and A.Uehara: "Coordination Asymmetry of a Dinuclear Copper (II) Complex : Synthesis, Structure, and Magnetism." Bull.Chem.Soc.Jpn.69, No.2. 389-397 (1996) 

[Publications] H.Sugimoto, Y.Hayashi, C.Koshi, S.Fujinami, M.Suzuki, Y.Maeda, and A.Uehara: "Formation of a Tetranuclear High-Spin Iron (II,III,II,III) Mixed Valence Complex" Chem.Lett.No.10. 933-934 (1996) 

[Publications] K.Yamaguchi, S.Koshino, M.Suzuki, A.Uehara, and S.Suzuki: "Structures and Catalytic Activities of Carboxylate-bridged Dinickel (II) Complexes as Models for the Metal Center of Urease" J.Am.Chem.Soc.119, No.24. 5752-5753 (1997) ▼

[Publications] H.Hayashi, S.Fujinami, M.Suzuki, K.Tanaka, and A.Uehara: "Dioxygen-Reactivity of a Copper (I) Complex with Tris (6-methyl-2-pyridyl-methyl) amine" J.Inorg.Biochem.67, No.1-4. 66 (1997) ▼

[Publications] K.Yamaguchi, S.Koshino, M.Suzuki, A.Uehara, and S.Suzuki: "Models for Urease : Structures and Reactivities of Carboxylate-Bridged Dinickel (II) Complexes" J.Inorg.Biochem. 67, No.1-4. 187 (1997) ▼

[Publications] Y.Hayashi, M.Obata, M.Suzuki, and A.Uehara: "Synthesis and Properties of Di- μ -superoxo Dinuclear Cobalt (II,III) Complex" Chem.Lett.No.12. 1255-1256 (1997) ▼

[Publications] M.Suzuki, S.Fujinami, T.Hibino, H.Hori, Y.Maeda, A.Uehara, and M.Suzuki: "Synthesis and Characterization of Mixed Valence μ -Alkoxodiiron (II,III) Complexes with an Unsymmetric Dinucleating Ligand." Inorg.Chim.Acta. (submitted). ▼

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