

MIXED-METAL PENTANUCLEAR COMPLEXES OF RUTHENIUM(II,III) CARBOXYLATE AND TETRACYANIDOPLATINATE(II)

Masahiro Mikuriya^{a*}, Kenta Ono^a, Shun Kawauchi^a, Daisuke Yoshioka^a,
Ryoji Mitsuhashi^a, Makoto Handa^b

^aDepartment of Applied Chemistry for Environment and Research Center for Coordination Molecule-based Devices, School of Science and Technology, Kwansei Gakuin University, 2-1 Gakuen, Sanda 669-1337, Japan

^bDepartment of Chemistry, Interdisciplinary Graduate School of Science and Engineering, Shimane University, 1060 Nishikawatsu, Matsue 690-8504, Japan

*e-mail: junpei@kwansei.ac.jp; phone: (+81 79) 565 8365; fax: (+81 79) 565 9729

Abstract. Mixed-metal complexes constructed from dinuclear ruthenium(II,III) carboxylates and tetracyanidoplatinate(II), $[\{\text{Ru}_2(\text{O}_2\text{CCH}_3)_4\}_2\text{Pt}(\text{CN})_4]\cdot 2\text{H}_2\text{O}$ (**1**) and $[\{\text{Ru}_2\{\text{O}_2\text{CC}(\text{CH}_3)_3\}_2\text{Pt}(\text{CN})_4\}]\cdot 2\text{H}_2\text{O}$ (**2**), were synthesized and characterized by elemental analysis and IR and UV-vis spectroscopies. These data are in accordance with the formulation of the PtRu_4 pentanuclear complexes with two lantern-type dinuclear Ru_2 and $\text{Pt}(\text{CN})_4$ units. A broad band at near-IR and a distinctive band at visible region (1088 and 443 nm for **1** and 1090 and 446 nm for **2**), which can be ascribed to a $\delta(\text{Ru}_2)\rightarrow\delta^*(\text{Ru}_2)$ and a $\pi(\text{RuO}, \text{Ru}_2)\rightarrow\pi^*(\text{Ru}_2)$ transitions, respectively, were observed in the diffused reflectance spectra. Temperature-dependence of magnetic susceptibilities (4.5-300 K) showed that antiferromagnetic interaction between the two $3/2$ spins of the Ru_2 units through tetracyanidoplatinate(II) is weak ($zJ = -0.1 \text{ cm}^{-1}$) with zero-field-splitting values of 45 and 65 cm^{-1} for **1** and **2**, respectively.

Keywords: dinuclear ruthenium(II,III) carboxylate, magnetic property, mixed-metal complex, tetracyanidoplatinate(II).

Received: October 2015/ Revised final: October 2015/ Accepted: October 2015